Honeywell



Profit Optimizer

A

Distributed Quadratic Program

(DQP)

User's Guide

for AM AxM and Open LCN-Side

Rev 1.4

1/00

PR11-420

TotalPlant

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Table of Contents

COPYRIGHT, NOTICES, AND TRADEMARKS IV

TABLE OF CONTENTS V

ABOUT THIS PUBLICATION X

Statement of Work x
Release Information x
What This Book Tells You x
Other Books in the Profit Library x
Who Should Use This Book xi
Profit Course Information xi
How This Book Is Organized xi
Writing Conventions Used in This Book xiii

REFERENCES XIV

Documentation xiv

FOR TECHNICAL ASSISTANCE XV

If You Need Assistance xv
International Customers xv
Customers Inside the United States xv
Arizona Customers xv
Services Provided xv
Time Saving Tip xv

SECTION 1 — AN OPERATOR'S QUICK TOUR OF PROFIT OPTIMIZER DISPLAYS 1

1.1 Getting Started 1
Read This 1
In This Section 1
1.2 Control Concepts You Need to Understand 2
Know the Name to Own the Concept 2
CVs, MVs, DVs, BDVs and CCs and Defined 2
CV, MV, and DV BVD, CC Statuses 3
What the Statuses Mean 3
MV Modes 4
Critical Variables 4
Constraint Handling 4
How Profit Optimizer Computes Control Moves 5
Controller Execution Intervals 5
Parameters 6
1.3 How to Read the Profit Optimizer Displays 7
Fields and Targets 7
Example Display 8
Key Access Level 9
What Colors Mean on Profit Optimizer Displays 9
1.4 The Optimizer Bar 10
Defined 10
Current Optimizer Box 10
Optimizer Modes 11
Optimizer Status 12
1.5 The Menu Bar 13
Defined 13
Displaying Profit Optimizer Screens 13
1.6 Profit Optimizer Display Structure 14

Number and Purpose of the Profit Optimizer Displays....14
Calling Sequence of the Profit Optimizer Displays....14
Display Descriptions....14
1.7 Profit Optimizer Messages and Help....16
Messages....16
Help....16
1.8 How to Inactivate the Optimizer Point....17
Shut the Optimizer Off First....17
Then Use the Point Detail Pages....17
To Restore Control....17
Why You Need to Do This....17
Consequences on Other Optimizers....17

SECTION 2 – APPLICATION SELECTION AND OPTIMIZER DETAIL DISPLAYS....19

2.1 Overview....19
In This Section....19
Top Level Displays....19
Selecting a Optimizer....19
Most-Used Operator Displays....20
2.2 Application Selection (Profit Optimizer Main Menu)....21
Sample Screen....21
Displaying the Screen....22
Selecting a Optimizer....22
Application Notes....22
2.3 RMPCT DQP Detail Display....23
Sample Screen....23
Using the Screen....23
Field Descriptions....25
Application Notes....28
2.4 RMPCT Summary Display....29
Sample Screen....29
Using the Screen....29
Field Descriptions....30
Application Notes....30

SECTION 3 – DISPLAYING AND USING THE SUMMARY SCREENS....31

3.1 Overview....31
In This Section....31
Optimizer Summaries....31
Control Details....31
3.2 Profit Optimizer's DQP CV Summary....32
Sample Screen....32
Using the Screen....32
Field Descriptions....33
Application Notes....34
3.3 Profit Optimizer's DQP MV Summary....35
Sample Screen....35
Using the Screen....35
Field Descriptions....36
Application Notes....37
3.4 Profit Optimizer's DQP DV Summary....38
Sample Screen....38
Using the Screen....38
Field Descriptions....39
3.5 Profit Optimizer's DQP Bridge Output Summary....40
Sample Screen....40
Using the Screen....40
Field Descriptions....41
3.6 Profit Optimizer's DQP Combined Constraint Display....42

Sample Screen 42
Using the Screen 42
Field Descriptions 43
Application Notes 44

SECTION 4 – DISPLAYING AND USING THE DETAIL SCREENS 45

4.1 Overview 45
In This Section 45
Target Access Levels 45
Paging through Detail Screens 45
Displaying the Point Detail Pages 45
4.2 Profit Optimizer's DQP CV Detail Display 46
Sample Screen 46
Using the Screen 46
Field Descriptions 47
Application Notes 51
4.3 Profit Optimizer's DQP MV Detail Display 52
Sample Screen 52
Using the Screen 52
Field Descriptions 53
Application Notes 56
4.4 Profit Optimizer's DV Detail Display 57
Sample Screen 57
Using the Screen 57
Field Descriptions 58
Application Notes 59
4.5 Profit Optimizer's DQP Bridge DV Detail Display 60
Sample Screen 60
Using the Screen 60
Field Descriptions 61
Application Notes 62
4.6 Profit Optimizer's DQP Comb Constraint Detail Display 63
Sample Screen 63
Using the Screen 63
Field Descriptions 64
Application Notes 65

SECTION 5 – DISPLAYING AND USING THE TUNING SCREENS 67

5.1 Overview 67
In This Section 67
Optimization Parameters 67
Target Access Levels 67
5.2 Profit Optimizer's DQP CV Optimizer Tuning Display 68
Sample Screen 68
Using the Screen 68
Field Descriptions 69
5.3 Profit Optimizer's DQP MV Optimizer Tuning 70
Sample Screen 70
Using the Screen 70
Field Descriptions 71

SECTION 6 – DISPLAYING AND USING THE POINT DESCRIPTION CONFIG SCREENS 73

6.1 Overview 73
Engineers – Read This 73
In This Section 73
Tag Names and Graphics Descriptions 73
ENG Access 73
6.2 Profit Optimizer's DQP/RMPCT Configurations 74
Sample Screen 74

Using the Screens....74
Field Descriptions....75
6.3 Profit Optimizer's DQP Bridge DV Config....76
Sample Screen....76
Using the Screens....76

SECTION 7 – DISPLAYING AND RESPONDING TO PROFIT OPTIMIZER MESSAGES....79

7.1 Overview....79
Profit-Optimizer Generated Messages....79
Examples....79
LCN Hardware and Software Messages....80
Run Time Messages and Process History....80
Controlling Where Messages are Sent....80
Questions? Call TAC....80
7.2 Message Handling....81
LCN Message Summary....81
LCN Message Journal....81
Alarms....81
7.3 Profit Optimizer Software Messages....82
Message Levels....82
Sample Display....82
7.4 Dictionary of Profit Optimizer Messages....83
How This Dictionary Is Organized....83
Profit Optimizer Messages 1 - 6....84
Profit Optimizer Messages 7 - 11....85
Profit Optimizer Messages 12-18....86
Profit Optimizer Messages 19-26....87
Profit Optimizer Messages 27-33....88
Profit Optimizer Messages 34-39....89
Profit Optimizer Messages 40-46....90
Profit Optimizer Messages 47-52....91
Profit Optimizer Messages 53 - 56....92
Profit Optimizer Messages 57 - 63....93
Profit Optimizer Messages 64 - 68....94
Profit Optimizer Messages 70 - 75....95
Profit Optimizer Messages 76 - 82....96
Profit Optimizer Messages 83-128....97
Profit Optimizer Messages 180-185....100
Profit Optimizer Messages 186-191....101

APPENDIX – OPERATOR'S QUICK REFERENCE....103

Overview....103
Engineers–Read This....103
How Tasks Are Described....103
For Tuning Information....103
About the Procedure Tables....103
Changing the MV Mode....104
Procedure....104
Notes....104
Changing CV, MV Operating Ranges....105
Procedure....105
Notes....105
Procedure....106
Notes....106
Displaying the Optimizer Detail....107
Procedure....107
Notes....107
Displaying CV and MV Tuning and Optimization Parameters....108
Procedure....108

Notes 108
Displaying and Acknowledging LCN Messages....109
Procedure 109
Notes 109
Displaying Profit Optimizer Messages....110
Procedure 110
Notes 110
Inactivating the Optimizer Point....111
Procedure 111
Notes 111
Selecting an Optimizer....112
Procedure 112
Notes 112
Shutting Down / Reloading / Restarting the AM....113
Procedure 113
Notes 113
Turning the Optimizer OFF....114
Procedure 114
Notes 114
Procedure 115
Notes 115

About This Publication

Statement of Work

The following table describes the audience, purpose, and scope of this book.

Purpose	Explains how to use the Profit Optimizer software
Audience	Process and control engineers
For Product Release	All Profit Optimizer releases (See Release Information below) LCN releases 500 and 600 series. All AM releases except 30.72-30.75; 40.43-40.45; 41.1-41.14

Release Information

This is document version 1.4 for Profit® Optimizer software releases 160.00. This book can be used for earlier releases; However, some of the functionality described here is not available in releases before R160.00. For Profit Optimizer releases after 160.00 see the Release Notes.

What This Book Tells You

A Profit Optimizer (DQP) is a dynamic quadratic programming, multi-input multi-output (MIMO) optimizer application, that controls and optimizes highly interactive industrial processes.

Profit Controllers and Optimizers are fully integrated into Honeywell's TPS automated control system.

This book examines basic multivariable prediction control concepts, then explains how to use the TPS and the Profit interface (displays) to do the following:

(OPER access)

- Monitor real time processes controlled with Profit Controllers/Optimizers
- Manually give on-line process instructions to the Profit Controllers/ Optimizers

(ENG access)

- Manually enter tuning, optimization, and configuration parameters
- Display and respond to Profit Optimizer messages.

Other Books in the Profit Library

Other books in the Profit library describe the important mathematical and design concepts underlying the Profit Controller and Optimizer, and explain how to install the programs, build points, and use the tools.

See references later in this section for a list of other Profit publications.

Who Should Use This Book

Operators This book is intended primarily for Operators working with TPS automated control system. However, anyone can use this book as a non technical introduction to the Profit Optimizer application.

Engineers Control Engineers can find this book a useful reference to the fields on the Profit Optimizer displays and to the messages.

Profit Course Information

Honeywell offers several courses that explain the math and conceptual underpinnings of the Profit Suite and how to implement the applications.

Engineers wanting a more technical exposure to the Profit Suite can contact their Honeywell Hi-Spec Solutions Sales person

How This Book Is Organized

The following table summarizes what each section in this book tells you about this publication and about Profit Optimizer.

In This Section	You Can Find This Information
About This Publication (You are here)	• How to make the best use of this book, and how the information is ordered. • What information you can find in the different sections. • What writing conventions have been used throughout this book and the Profit library.
Section 1, "An Operator's Quick Tour of Automated Process Control"	• A definition of controllers, model-based control, and control loops. • A discussion of the problems of multivariable control. • The advantages of DQP over other control strategies.
Section 2, "An Operator's Quick Tour of the Profit Optimizer Displays"	• An explanation of the Profit Optimizer structure. • An explanation of the Profit Optimizer display structure. • An explanation of Profit Optimizer control concepts: inputs, modes, statuses, and parameters. • How to read and use the Profit Optimizer displays.
Section 3, "Main Menu, and Optimizer Detail Display"	What the Profit Controller Selection, the Optimizer Detail, and the optional graphic displays are, and how to use them.
Section 4, "Displaying and Using the Summary Screens"	How to use the CV, MV, Bridged DV Output, and Combined Constraint Summary screens to monitor and control a process.
Section 5, "Displaying and Using the Detail Screens"	How to use the CV, MV, Bridged DV Output, and Combined Constraint Detail screens to monitor and control a process.
Section 6, "Displaying and Using the Tuning Screens"	How to use the Tuning screens to refine CV and MV control.
Section 7, "Displaying and Using the Point Description CONFIG Screens"	How to name (describe) interface and transformation points for the displays.
Section 8, "Displaying and Responding to Profit Optimizer Messages"	Profit Optimizer messages: what they mean, and how to respond.
Appendix – "Operator's Quick Reference"	Procedures for performing common Operator tasks.

Writing Conventions Used in This Book

The following writing conventions have been used throughout this book and other books in the Profit Suite library.

- Words in double quotation marks " " name sections or subsections in this publication.
- Words in *italics* name book titles, add grammatical emphasis, introduce words that are being referenced or defined, or represent mathematical variables. The context makes the meaning and use clear.
- Words in **bold type** indicate paragraph topics or bring important phrases to your attention.
- Shading brings paragraphs and table entries to your attention.
- Windows pull down menus and their options are separated by an angle bracket >. For example, Under Settings> Communications, set the baud rate.
- Messages and information that you type appear in `Courier` font.
- Acronyms, Scan parameters, point names, file names, and paths appear in UPPERCASE. The context makes the meaning and use clear.
- Command keys appear in UPPERCASE within angle brackets. For example, press <ENTER>.
- TPS user station touch-screen targets appear in rounded boxes. For example, touch MODIFY NODE.
- Graphic buttons appear in UPPERCASE within brackets [ ]. For example, touch [TAG].
- Point-dot-parameter means a point name and one of its parameters. For example, point-dot-SP means the SP parameter for the point.
- Zero as a value and when there is a chance for confusion with the letter O is given as Ø. In all other cases, zero as a numerical place holder is given as 0. For example, 1.0, 10, 101, CVØ1, parameter PØ.
- The terms *screen* and *display* are used inter changeably in discussing the graphical interfaces. The verbs *display* a screen and *call* a screen are also used inter changeably.
- The names Profit Controller (RMPCT), Profit Controller and RMPCT may be used interchangeably.
- The names Profit Optimizer (DQP), Profit Optimizer and DQP may be used interchangeably.

The names Profit Design Studio, and APC Development Environment may be used interchangeably.

References

Documentation

The following comprise the Profit Suite library.

Title	Number
General	
Profit Controller (RMPCT) Concepts Reference	*RM09-400*
Profit Controller (RMPCT) Designer's Guide (Off-Line Design)	*RM11-410*
Profit Optimizer Designer's Guide (Off-Line Design)	*PR11-400*
Profit Toolkit Designer's Guide	*AP11-400*
APC Development Environment (Old. Replaced by Designer's Guides)	*AP09-100*
APC Identifier User's Guide	*AP09-200*
Profit-PID (RPID)	*RM11-100*
Profit Sensor User's Guide	*PS09-100*
Open	
Profit Suite Installation Guide for Open Systems Viewer - Controller - Optimizer - Toolkit	*RM20-501*
Profit Controller (RMPCT) User's Guide for Open Systems	*RM11-401*
Profit Optimizer User's Guide for Open Systems	*PR11-421*
Profit Toolkit User's Guide for Open Systems	*AP11-401*
Profit Trender User's Guide	*RM11 431*
FCCU Toolkit User's Guide for Open Systems	*AP13-201*
Fractionator Toolkit User's Guide for Open Systems	*AP13-101*
LCN	
Profit Controller (RMPCT) Installation Reference for AM, AxM and Open LCN-Side	*RM20-400*
Profit Controller (RMPCT) Commissioning	*RM20-410*
Profit Controller (RMPCT) User's Guide for AM, AxM and Open LCN-Side	*RM11-400*
Profit Optimizer Installation Reference for AM, AxM and Open LCN-Side	*PR20-400*
Profit Optimizer User's Guide for AM, AxM and Open LCN-Side	*PR11-420*
Profit Suite ToolKit TDC Data Converter Data Collector Step Test Builder Performance Monitor RMPCT Cascade PV Validation Simulation BackBuilder Gain Scheduler	*AP09-300*
Fractionator Toolkit (LCN)	*AP13-100*
FCCU Toolkit (LCN)	*AP13-200*
Furnace Pass Balance Temperature Control User's Guide	*AP09-600*
Non-Linear Level Control User's Guide	*AP09-700*

For Technical Assistance

If You Need Assistance

If you need technical assistance, contact your local Honeywell Service Organization, as explained in the following paragraphs.

International Customers

Outside of the United States, contact your local Honeywell Service Organization. If you are not sure of the location or telephone number, call your Honeywell representative for information.

Customers Inside the United States

Within the United States, call the Technical Assistance Center (TAC) at the toll free number 1-800-822-7673.

Arizona Customers

Within Arizona, the local number for TAC is 602-313-5558.

Services Provided

Calls to TAC are answered by a dispatcher from 7:00 A.M. to 5:00 P.M., Mountain Standard Time (6:00 A.M. to 4:00 P.M. when daylight savings time is in effect).

Outside of these hours, emergency calls—those which affect your ability to control or view a process—will be received by an answering service, and returned within one hour. TAC maintains its own TPS system, and frequently can duplicate problems on this equipment.

Time Saving Tip

It is a good idea to make specific notes about the problem before making the call. This helps to reduce delays and expedite answers.

Section 1 — An Operator's Quick Tour of Profit Optimizer Displays

1.1 Getting Started

Read This

Attention

Information in this section is a primer to information presented later in this book, and is fundamental to the Profit® Optimizer displays. Read this section carefully.

If you are unfamiliar with control basics, such as controllers, process models, and loops, read Section 1 before trying to digest the information in this section. This section assumes that you have a working familiarity with basic control strategies and terminology.

You need to be familiar with the terms and concepts central to the organization, design, and use of the Profit Optimizer displays before you can expect to use the displays effectively.

In This Section

This section explains basic process control and screen design concepts crucial to understanding and using the Profit Optimizer displays. Read this section to find out how to:

- Distinguish between the control functions of controlled variables (CVs), manipulated variables (MVs), and disturbance variables (DVs)
- Distinguish operating parameters from tuning parameters, and understand the control function that each of them perform
- Understand controller statuses and states
- Recognize targets, and distinguish between open and closed targets
- Be sensitive to the meaning of color on Profit Optimizer displays
- Recognize the Controller Bar on any Profit Optimizer display
- Recognize the Menu Bar and be able to display any Profit Optimizer screen, especially those of special interest to Operators.

1.2 Control Concepts You Need to Understand

Know the Name to Own the Concept

The Profit Optimizer displays use control terms that might be new to you. If you are unfamiliar with these terms and the concepts they represent, how Profit Optimizer goes about its control tasks might remain unnecessarily obscure to you.

Understanding controller states and statuses, and being familiar with the different variables and how Profit Optimizer uses them are, for example, of fundamental importance to anyone using the Profit Optimizer displays.

CVs, MVs, DVs, BDVs and CCs and Defined

You need to be aware of five important variables in Profit Optimizer: controlled variables (CVs), manipulated variables (MVs), and disturbance variables (DVs), bridge DVs (BDVs) also referred to as bridge outputs and combined constraints (CCs). Profit Optimizer uses these variables in its prediction and control calculations. Table 1-1 defines the Profit Optimizer variables.

Table 1-1 How Profit Optimizer Uses CVs, MVs, BDVs and CCs

Variable	Description
CV	CVs (often called PVs, process variables) are the process conditions to be controlled (the temperature of an outflow stream can be a CV). To Operators, these are the most important variables to watch. Setpoints and operating ranges establish the control objectives for these variables. Some CVs are continuous inputs to the controller. These values are read and input into calculations at every controller execution. Other CVs are periodic inputs to the controller, such as data from analyzers.
MV	MVs are the control handles on the process. These are the variables whose conditions are manipulated (changed) to control the CVs (the gas flow into a furnace can be an MV).
DV	DVs are measured disturbances (changes) in the process that influence the CVs but that are themselves not controllable by Profit Optimizer (the temperature of an inflow stream can be a DV).
BDV	Connects process information between the Profit Controllers. Changes from Profit Controller's MVs and DVs that effect CVs in other controllers are transferred through the BVDs
CC	Combined Constraints are steady state variables that are a linear combination fo MVs and DVs. These variables do not have dynamics and don't have feedback from the process.

At each execution interval, the controller checks these variables. As their values change, the controller predicts how the process will change. From these predictions, the controller calculates suitable control moves (based upon the tuning and optimization parameters defined for the process).

CV, MV, and DV BVD, CC Statuses

The status of a variable indicates its operating state or condition, what the controller is doing with it. The status is a window into the controller to see how the controller is using the variable, or what confidence the controller has in the variable as a control value.

On the Summary screens, status displays in the [STAT] field

On the Detail screens, status displays in the [STATUS] field.

What the Statuses Mean

Table 1-2 describes the 12 statuses that indicate how the controller is using a variable.

Table 1-2 CV, MV, BVD and CC Statuses

This Status	Can Display for					What the Status Means
	CV	MV	DV	BDV	CC	
INIT	✓	✓		✓	✓	Variable is initializing.
ON		✓				MV is available to the controller.
INAC	✓	✓	✓	✓		Interface point is set INACTIVE.
GOOD	✓		✓	✓	✓	Controller is receiving a good signal.
DROP	✓		✓	✓	✓	Controller is not using the variable in the control solution.
FFWD		✓				MV is being used as a feedforward value.
LOW		✓				MV is clamped low or is at its low limit.
HIGH		✓				MV is clamped high or is at its high limit.
SERV		✓				Communication with the process is lost. The non critical MV is ignored.
CRIT	✓		✓	✓	✓	Critical value is bad.
PRED	✓			✓	✓	Controller is using the predicted CV value instead of a true measurement. Either the measured value is bad, or the value is an analyzer-type value.
WDUP	✓				✓	Nothing the controller can do. All effective MVs are currently under constraints.
-c	✓		✓			The suffix -c indicates a critical CV or DV . Shown only on the CV and DV summary displays.

MV Modes

There are two modes you can set to tell a controller how to use the output of an MV: RMPC, OPR. Table 1-3 explains how the controller uses the output of an MV for these modes.

Table 1-3 MV Modes

Mode	Action on the MV
RMPC	The variable is available for Profit Optimizer control.
OPR	MV adopts the configured status: FFWD or SERV. • FFWD = MV is treated as a feedforward disturbance. • SERV = MV is dropped from both the prediction and control calculations.
AUTO	For Profit, this standard TDC 3000 mode is not meaningful. MVs are treated as if they were in OPR.

Critical Variables

Critical variables are variables the controller must use. Any CV, MV, DV, BDV or CC can be set critical. The critical setting is a control flag that tells the controller that the variable is a required value in its calculations. As a required value, the variable must be used in the prediction and control calculations at every execution interval.

If the variable is unavailable or bad, the controller shuts down and sheds control to the default regulatory mode. Critical variables cannot be dropped or set OFF.

The number of controller executions that a bad or unavailable critical variable can be tolerated before the controller relinquishes control can be set through an associated operating parameter for CVs and BDVs.

Constraint Handling

Occasionally, Profit Optimizer cannot immediately move one or more CVs within range without sending other CVs out of range. When this condition exists, COORDINATING displays on the Optimizer Bar as the optimizer's status (see Table 1-8 for other optimizer statuses).

COORDINATING indicates that the optimizer is resolving intricate process relationships, and that it may take several optimizer executions to correct the disturbance.

Constraint conflicts are common in processes where variables are coupled or highly parallel.

How Profit Optimizer Computes Control Moves

These are the calculations Profit Optimizer uses to formulate its output:

- **Prediction Calculations** These calculations track the disturbance variables in the process as well as the results of previous control moves to predict where the process is going.
- **Control Calculations** From where the prediction calculations estimate the process is going, the control calculations formulate adjustments to the process to meet the control objectives. The Profit Controllers calculate the control moves

  These adjustments are then output as control moves, increasing temperature, reducing flow, the like. The influence of these control moves is then tracked by the prediction calculations, which then again estimate where the process is going.
- **Optimization Calculations** These calculations push a process according to economic considerations after the control objectives are met. Profit Optimizer (DQP) calculates the optimal for all Profit Controllers. The Profit Controllers perform the control calculations.

Controller Execution Intervals

How frequently Profit Optimizer executes is user defined, and is generally determined by some combination of the following:

1. How critical (volatile) the process is
2. How tight the optmization needs to be
3. The dead time, or lag, and
4. The reaction time – how fast the process is (in Control Engineering terms, the length of the major time constants).

Experience with the process or similar processes, and information gathered at the step tests during identification usually give Control Engineers a good indication of an appropriate execution interval.

Parameters

The Profit Optimizer uses parameters in its calculations that define optimization objectives and refine optimization decisions. Most parameters are entered through the Profit Optimizer displays (some are entered through the off-line build). For our purposes, there are three kinds of parameters: configuration parameters, tuning parameters, and optimization parameters. Table 1-4 defines the Profit Optimizer parameters.

Table 1-4 Configuration, Tuning, and Optimization Parameters

Parameter	Description
Configuration	Configuration parameters define the process model and tell Profit Optimizer what files to read, and where to find them. Some of these parameters, such as the number of Profit Controllers, BDVs and CCs, for example, are established off-line when building the optimizer. Except when new controls are added or production methods change, there is no need to modify the configuration parameters of a Profit Optimizer implementation.
Tuning	Tuning parameters refine how Profit Optimizer controls CVs, MVs and CCs (DVs cannot be controlled so cannot be tuned). Tuning parameters determine the responsiveness and stability of the optimizer. There are two kinds of tuning parameters, process tuning parameters, and optimizer tuning parameters: • Process tuning parameters tell the optimzier how closely to follow the process, • Optimizer tuning parameters (such as optimization speed factor) establish the optimizer's responsiveness.
Optimization	Optimization parameters are a special kind of tuning parameter that optimize production based upon economic priorities established for the process. These parameters do not come into play until after control objectives are met. At each optimizer execution, once the optimizer objectives have been met, the optimizer, as defined by the optimization parameters, will push or pull the process to some economic benefit. This push-pull might minimize utility costs, or maximize the yield of a more valuable product. When the optimizer is optimizing, OPTIMIZING displays on the Optimizer Bar as the optimizer's status.

1.3 How to Read the Profit Optimizer Displays

Fields and Targets

Fields and targets are reserved areas on a display, dedicated to a particular purpose or kind of information. In this respect fields and targets are much the same.

For convenience, however, fields and targets in Profit Optimizer have special meaning, described in the following table:

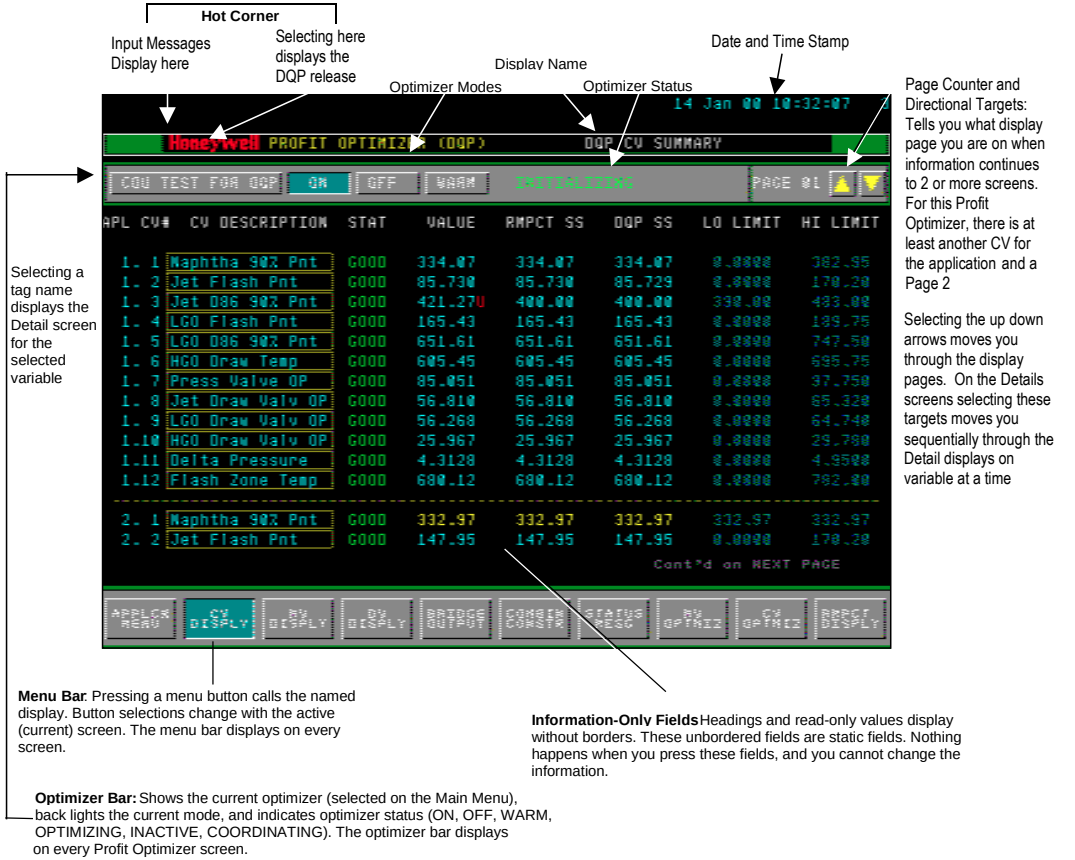
Table 1-5 Fields and Targets Explained

In the Profit Optimizer Library of Books . . .	
This Term	**Means This**
Field	*Fields* are read-only screen areas. Fields display information that you cannot change. Read-only information displays without borders outlining the field. The time and date stamp, for example, is a read-only field.
Target	*Targets* are screen areas that accept, tuning, configuration, and optimization input from the keyboard, or that execute touch-screen commands. Targets are surrounded by borders. Pressing anywhere within the rectangular border either opens the target, or executes the command. • **Open Targets** Open targets accept keyboard or touch-screen input. Open targets are surrounded by a yellow border. • **Closed Targets** Closed targets do not accept keyboard or touch-screen input when touched. Closed targets are surrounded by a blue border. A target can be closed for two reasons: 1. A higher access level is required, or 2. The CV or MV is critical, and certain changes to critical variables (such as a mode change to an MV) cannot be made.

Example Display

Figure 1-1 shows fields and targets on a typical Operator display. Discussion following the sample display tells you how to use the screen to display specific information about a Profit Controller.

Figure 1-1 Example Operator Display Explained



Key Access Level

The standard Profit Optimizer package applies one of two access levels to targets on Profit Optimizer displays: OPERator or ENGineer. By default, the SUPVR (Supervisor) access is the same as Operator. Responsibility that typically falls to Control Engineers (tuning, for example) is given ENG access.

What Colors Mean on Profit Optimizer Displays

On Profit Optimizer displays, colors convey specific information. Through a quick visual scan of a display, color quickly informs you about what is going on with your process. Table 1-6 explains what colors mean on Profit Optimizer displays.

Table 1-6 How Colors Convey Information on Operator Displays

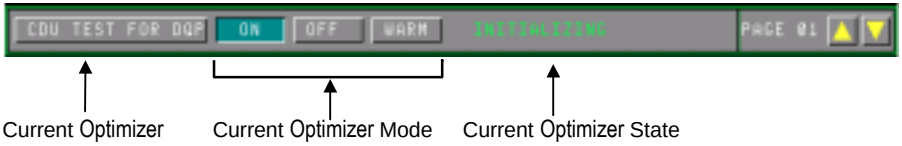
This Field	When Displaying This Color	Indicates This Condition
Status or State	Green	OK, operating normally.
	Red	Critical variable is out of service.
	Yellow	(1) A dropped variable, or (2) An MV used as feedforward.
Target	Yellow target border	Open target. Changes are permitted.
	Blue target border	Locked target. Changes are not permitted. Higher key access required.
Value (Process-Related)	Cyan (light blue)	Within limits.
	Half cyan	Optimizer is using the predicted value because the actual value is either bad or unavailable. Predicted value is within limits.
	Yellow	Near limits.*
	Half yellow	Optimizer is using the predicted CV value because the CV is either bad or unavailable. Predicted value is near limits.*
	Red	Violating limits.
	Half red	Optimizer is using the predicted CV value because the CV is either bad or unavailable. Predicted value is violating limits.

- See the Application Notes after the CV Summary field descriptions in Section 4.2 for an illustration of what *near* limits means in Profit Optimizer..

1.4 The Optimizer Bar

Defined

The Optimizer Bar displays near the top of the screen and shows the name of the current (selected) optimizer, the optimizer mode, and the optimizer state.



The Optimizer Bar displays on every Profit Optimizer screen except on the main menu.

Current Optimizer Box

The current optimizer box is a target, displaying the name of the current, selected optimizer. Any Profit Optimizer screen that you call displays information about the optimizer named in this box.

To display information about a different optimizer, return to the application menu, select another optimizer, then press <ENTER>. This selection then becomes your current optimizer. Any Profit Optimizer screen that you then call displays information about this optimizer.

Pressing anywhere in the current optimizer box on any Profit Optimizer screen displays the Optimizer Detail screen.

Optimizer Modes

The optimizer mode establishes the personality of the optimizer. Modes are set through touch-screen targets. Table 1-7 explains the three optimizer modes.

Table 1-7 Optimizer Modes

Mode	Description
	The normal operating state. In this state, Profit Optimizer optimizes the process.
	• Pressing OFF takes Profit Optimizer off-line from the process. Control sheds to the configured Profit Controllers. • Profit Optimizer continues to track the CVs, but is not manipulating the MVs to regulate the CVs. The optimizer is getting process values and predicting where the CVs are going, but is not executing its algorithms, and no control moves are output. • CV values are updated on the Profit Optimizer displays.
	• Intended for commissioning (startup). • In this mode, CVs are being tracked, and prediction and optimization algorithms are executing. • MV moves are sent to the Profit Optimizer displays, but not to the process. This gives you a chance to watch the control moves on the displays before giving Profit Optimizer control of the process. • You can check that the CVs and MVs are doing what you want according to the tuning, and optimization parameters that you have set. • Default access is ENG.

Optimizer Status

The optimizer status indicates internal conditions about the optimizer. There are 12 controller statuses that display as a read-only field as part of the Optimizer Bar. Table 1-8 describes what information the status tells you about the optimizer.

Table 1-8 Optimizer Statuses

Status	Description
CONTOL ABORT, SEE MSGS	Optimization error encountered. Select [STATUS MESG] on the Menu Bar to read the error.
CL ERROR	Control Language error on the Profit Optimizer point.
COORDINATING	The optimizer is indicating that it has encountered competing objectives and that bringing all variables within constraints cannot be managed at the current execution, or cannot be managed within the prescribed horizon. **CAUTION** Competing constraints are usually temporary conditions, provided that operating conditions have not changed since last tuned. It remains your responsibility, however, to know what is going on with your process and when manual intervention is required.
INACTIVE	Optimizer point is shut OFF. Profit Optimizer is not tracking the CVs, is not executing calculations, and is not controlling the MVs.
INITIALIZING	Optimizer is aligning itself with current process conditions and running integrity checks on points.
OFF	Optimizer is receiving input from the process and making prediction calculations, but there is no controller output.
ON	Optimizer is running (without optimization).
OPTIMIZING	Optimizer is running, and the control objectives at the current execution have been met. Profit Optimizer is now attempting to optimize the process based upon the economic objectives.
SEE STATUS MESSAGES	Conditions exist that potentially threaten the quality of control. The Profit Optimizer is at risk of shutting off and shedding to the individual Profit Controllers. Select [STATUS MESG] on the Menu Bar to read the error.
WARM	Controller is receiving input from the process and making both prediction and control calculations, but there is no controller output.
ESTABLISHING RMPCT CONNECTIONS	Waiting for Profit Controller (RMPCT) to acknowledge Profit Optimizer's presence and establish communications.

1.5 The Menu Bar

Defined

The Menu Bar is a row of 10 named buttons for calling Profit Optimizer screens. The Menu Bar displays at the bottom of every screen. Selecting a button calls the named display.

Displaying Profit Optimizer Screens

Some displays do not have a button on the Menu Bar and must be called by selecting targets on other, higher level displays. Table 1-9 explains the buttons on the Menu Bar and the screens they call.



Table 1-9 How to Use the Menu Bar

Button Name	Calls This Display	Comments about the Display
APPLCN MENU	Main Menu	For selecting an optimizer.
CV DISPLY	CV Summary	For setting optimization parameters.
MV DISPLY	MV Summary	
DV DISPLY	DV Summary	
BRIDGE OUTPUT	Bridge Output Summary	
COMBIN CONSTR	Combined Constraints Summary	
STATUS MESG	Messages	Shows Profit Optimizer messages only. See Section 9 for information.
MV OPTMIZ	MV Optimizer Tuning	For setting optimization tuning parameters.
CV OPTMIZ	CV Optimizer Tuning	
RMPCT DISPLY	RMPCT Controllers Summary	Shows the Profit Controllers (RMPCTs) associated with the Profit Optimizer.

For more information on the Profit Optimizer displays and how to call them, see Figure 1-2 and Table 1-10 later in this section. See Sections 3 through 8 for specific operating information about each display.

1.6 Profit Optimizer Display Structure

Number and Purpose of the Profit Optimizer Displays

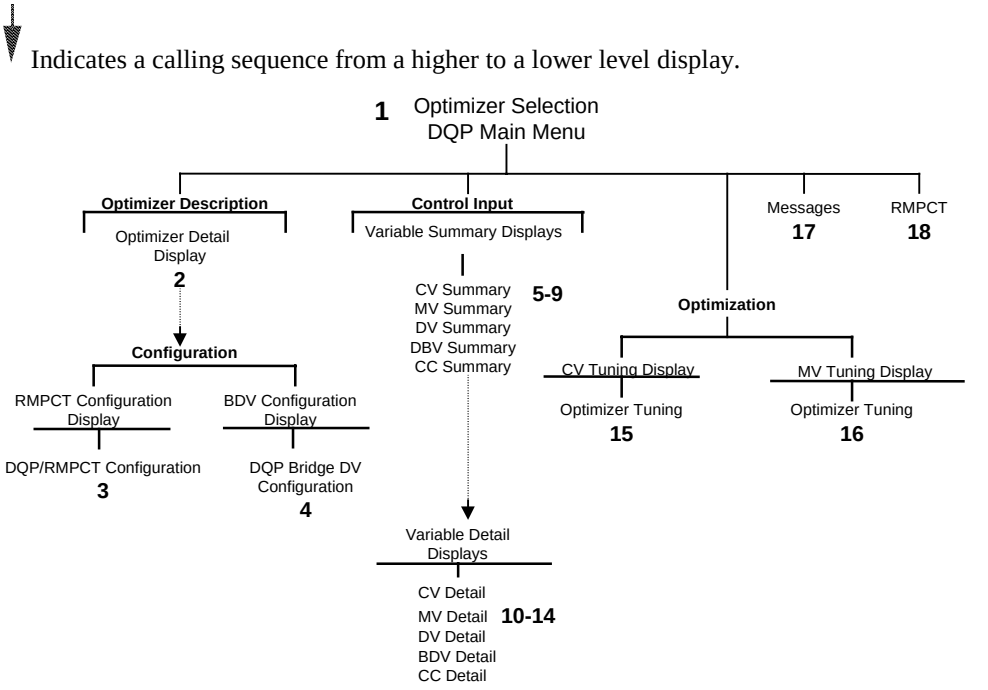
The Profit Optimizer interface comprises 18 displays. The Profit Optimizer interface provides the following administrative, control, tuning, and configuration functions:

- Optimizer selection
- On-line messages
- On-line help
- Optimizer management (operating parameters, optimizer input)
- Configuration management (configuration, tuning, optimization parameters).

Calling Sequence of the Profit Optimizer Displays

Most displays can be called directly from the Menu Bar. Others, however, can only be called by selecting targets on higher level displays. Figure 1-2 illustrates the hierarchy of the Profit Optimizer displays.

Figure 1-2 Display Calling Sequence



Profit Optimizer displays are discussed in detail in Sections 3 through 6.

Display Descriptions

Table 1-10 describes the roles of the screens and how to display them. Higher level displays are indicated in the Called From column.

Role in Profit	Display Names	Number in Figure 1-2	Description	Called From
Optimizer Selection	Profit Optimizer Main Menu (Application Selection)	**1**	This is the optimizer selection menu for all optimizers installed on the system.	Menu Bar
Optimizer Description	Optimizer Detail	**2**	Displays configuration management information and information about the optimizer's performance.	Optimizer Bar
Configuration	Profit Optimizer/RMPCT Configuration	**3-4**	Used to name Profit Controller (RMPCT) points.	Optimizer Detail Display
	Profit Optimizer Bridge DV Configuration		Used to name bridge output points.	Optimizer Detail Display
Control Input	CV, MV, DV, BDV, CC Summary	**5-9**	Used to set optimization parameters. Displays status, and current and predicted values.	Menu Bar
	CV, MV, DV, BDV, CC Detail	**10-14**	Used to set optimization parameters and some tuning parameters.	Summary Displays
Tuning and Optimization	CV, MV Optimizer Tuning	**15-16**	Used to set parameters for optimization.	Menu Bar
Messages	Messages	**17**	Displays optimizer status and optimization and software error messages.	Menu Bar
RMPCT	RMPCT Summary	**18**	Displays controllers status and used to set the connection type, critical controllers, and optimization coefficient copy path.	Menu Bar

1.7 Profit Optimizer Messages and Help

Messages

Application Error Messages Select the [STATUS MESG] button on the Menu Bar to display application error messages. These messages indicate conditions about Profit Optimizer software and optimizer. Error messages remain on the messages display as long as the error is in effect.

For a description of the messages and the suggested responses to the optimization or software errors, see Section 9.

Message Summary and Alarms Some Profit Optimizer messages are written to the system Message Summary. You display the Message Summary by pressing the <MSG SUMM> button on the console.

Profit Optimizer itself does not generate alarms on error. Alarms are handled by the LCN software and the advanced process control design.

Run Time Messages and History For run time messages and process historization, look in the Message Journal.

Help

Error-on-Input Messages Information messages display in the hot corner (upper left) of the screen when you touch a target, or when you try to do something that Profit Optimizer does not allow.

Parameter Descriptions/CDS Locations On the Detail displays, selecting the control parameter names (pressing the named fields, not the values or targets) displays descriptions of the parameters and their CDS location. This information displays above the Menu Bar.

1.8 How to Inactivate the Optimizer Point

Important! Engineers Read This!

Shut the Optimizer Off First

Use the Optimizer Bar – Select OFF [ENTER] Always shut Profit Optimizer OFF from the Optimizer Bar before setting the point INACTIVE. Not doing so has consequences for the current Profit Optimizer, and can have consequences for other Profit Optimizers on the LCN.

Then Use the Point Detail Pages

After shutting the optimizer down with the OFF button from any Profit Optimizer display, call the Point Detail for the main optimizer point and INACTIVATE the point.

To Restore Control

To bring Profit Optimizer back on-line, reactivate the optimizer point then either bring the Optimizer back on-line (WARM/ON).

Why You Need to Do This

Profit Optimizer manages a 1.2MB workspace to form its optimization matrix. Only one optimizer can have this space at a time. To control this space, Profit Optimizer sets an internal flag

Where 1=occupied Ø=available

When an optimizer is running calculations in this space, the flag is set 1. Other optimizers wanting to run a calculation have to wait for the space to open. On exit, the flag is set Ø, and the workspace is freed.

Consequences on Other Optimizers

Caution

If the optimizer you inactivate is occupying the workspace, and the optimizer is not first shut OFF, the workspace flag is not reset. Other optimizers cannot get into the workspace, so they cannot run their calculations, and cannot execute. Execution overlaps begin, and optimization is eventually shed.

To restore optimization when this happens, shut down and restart the AM. If changes have been made on AM, checkpoint AM before shutting down.

Section 2 – Application Selection and Optimizer Detail Displays

2.1 Overview

In This Section

This section shows sample displays of the Profit Optimizer main menu, Optimizer Detail. After reading this section, you should understand these displays well enough to be able to do the following:

- Know how to call the Application Selection Menu, the Profit Optimizer Detail display, and the Process Display
- Select an optimizer
- Find the status of an optimizer
- Review the optimizer's performance
- Display the Point Detail for the optimizer point.

Top Level Displays

Profit Optimizer provides two fundamental, high level displays that can be thought of as entry ways into a Profit Optimizer implementation. Collectively, these displays work as introduction and entry way to your Profit Optimizer application:

- **Application Selection Menu** The Application Selection Menu is the Profit Optimizer main menu used to select an optimizer. As many as 30 optimizers can display on this screen.
- **Profit Optimizer Detail Display** The Optimizer Detail display gives basic information about an optimizer's configuration and performance.

Selecting a Optimizer

To display information about any Profit Optimizer, you must first select the optimizer on the Application Selection Menu. Selecting an optimizer name on the main menu and selecting <ENTER> displays the CV Summary information for that application.

Selecting the optimizer box (upper left of the screen) calls the Optimizer Detail display. The Optimizer Detail shows fundamental information about that optimizer. Introducing yourself to an optimizer through the Optimizer Detail is a good idea if you are new to Profit Optimizer, if a Profit Optimizer is new to your network, or if an existing optimizer has been reconfigured.

Most-Used Operator Displays

Operators can expect to use the Summary and Detail displays most in day-to-day operations.

The Summary and Detail displays are where the process values display (current values, steady state values, PV status), and where control parameters are set (setpoints, high and low limits).

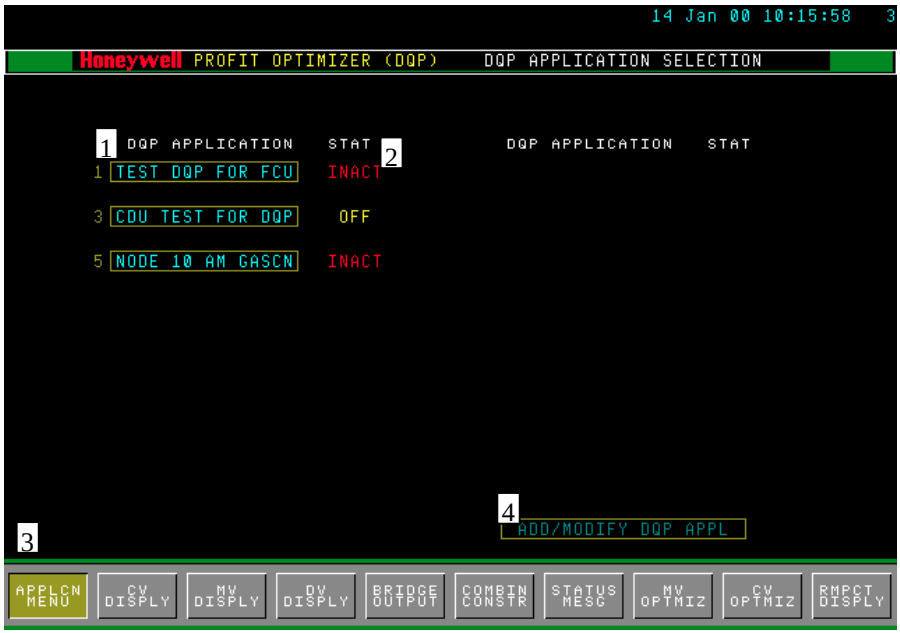
- Summary displays are called from the Menu Bar.
- Detail displays are called from the Summary displays by selecting a variable description.

2.2 Application Selection (Profit Optimizer Main Menu)

Sample Screen

Figure 2-1 shows a sample Profit Optimizer's DQP Application Selection Menu, which is the Profit Optimizer top level display, or main menu. From this menu you select the application (the optimizer) that you want to display.

Figure 2-1Profit Optimizer's DQP Application Selection



	Name	Description
1.	Optimizer Names	Optimizer names (applications) display in a column of targets. Every optimizer on the LCN appears here. Up to 30 can display. Selecting a target and pressing <ENTER> displays the CV Summary for that optimizer. Once you have selected an optimizer, any menu button you touch on the Menu Bar displays information for that application.
2.	Optimizer Status	Indicates the software condition of the optimizer
3.	APPLCN MENU	To display information about a different optimizer, touch this target from any display to return to this screen and make a new optimizer selection.
4.	[ADD/MODIFY DQP APPL]	Select if you want to add or modify a Profit Optimizer Application

Displaying the Screen

Select [APPLCN MENU] on the Menu Bar from any display.

Selecting a Optimizer

Optimizer Names The Application Selection Menu lists the Profit Optimizers. This list includes the name of each optimizer (up to 30 can display) and the optimizer status. You can select any optimizer in the list. To select, touch the optimizer name, then press <ENTER>.

Making a Selection The name of the optimizer that you select displays in the upper left corner of every Profit Optimizer display. Selecting this target (the optimizer box) displays the Optimizer Detail screen, Figure 2-2.

Application Notes

The following information can help you select an optimizer and use the Profit Optimizer displays:

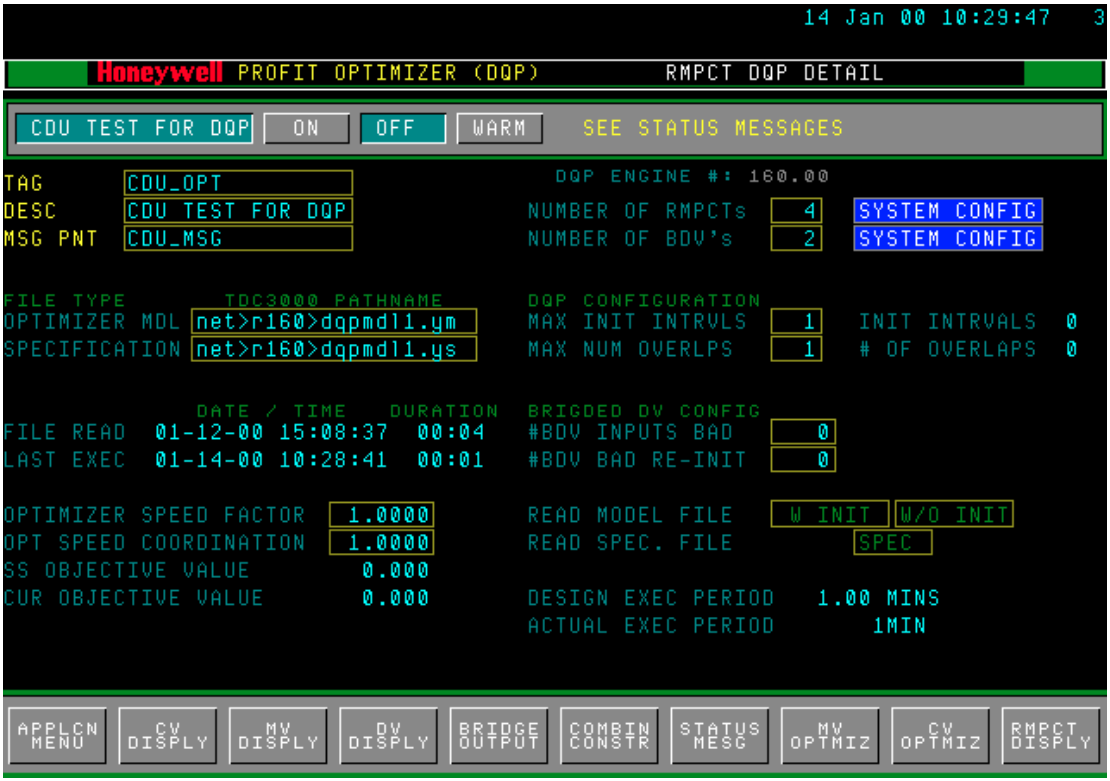
- Each Profit Optimizer installation has a capacity for 30 optimizers. However, because of the way Profit Optimizer handles display database variables, **Profit Optimizer can load information for only one optimizer at a time**. The Profit Optimizer menu buttons only display information for the optimizer that appears in the current optimizer box.
- **To display information about an optimizer**, you must first select it from the Application Selection Menu.
- **To display information about a different optimizer**, you must return to the Application Selection Menu and select a different optimizer from the list.
- **Profit Optimizer sessions can display different initial screens**:
  - For the first session after installing Profit Optimizer or resetting a node, the [APPLCN MENU] button blinks. Select this button to display the main menu and select an optimizer.
  - After you select an optimizer and press <ENTER>, the CV Summary screen automatically displays.
  - When you leave Profit Optimizer to access the TDC 3000 functions (the Point Detail display for example), pressing <PRIOR DISPLY> on the operator console returns you to the same Profit Optimizer screen.

2.3 RMPCT DQP Detail Display

Sample Screen

Figure 2-2 shows a sample Profit Optimizer's RMPCT DQP Detail screen. Your display will show different information about the optimizer.

Figure 2-2 RMPCT DQP Detail screen



Using the Screen

To display this screen from any Profit Optimizer display, touch the current optimizer box on the Optimizer Bar. Table 2-1 describes the setup and optimizer configuration tasks that you can perform from the Optimizer Detail screen (see the Field Descriptions for help):

Table 2-1 RMPCT DQP Detail

Use the RMPCT DQP Detail Screen for These Tasks . . .	
Operator	**Engineer**
Displaying the Point Detail pages for the optimizer point [TAG].	• Setting paths to the optimizer definition files and specifying the message point. • Setting the optimizer speed factor. • Displaying information about the optimizer's performance. • Displaying the Point Detail pages for the Profit Optimizer point. • Displaying the Profit Controller and bridge DV point CONFIG screens.

Field Descriptions

Table 2-2 RMPCT DQP Detail –Understanding the Fields and Using the Targets

RMPCT DQP Detail Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Tag	Target OPER Name of the optimizer point.	Select to call the Point Detail pages.
Desc	Target ENG Description of the optimizer, typically the name of the process unit or section.	To redescribe the optimizer, touch the target, type the new description, press <ENTER>.
Msg Pnt Not for TPS AMW	Target ENG Name of the Profit Optimizer message point.	To enter a new message point, INACTIVATE the optimizer point first.
File Type Optimizer Model Specification Configuration	Read-Only No Access The .YS, .YM, and .CFG optimizer definition files created by the off-line design (from the Optimizer Builder).	These files supply the Profit Optimizer models and optimizer configuration. The configuration file is only for TPS version of Profit Optimizer
TDC3000 Pathname or TDC3000 AMW (TPS node or GANT) Filename	Target ENG Path to the .YS and .YM optimizer files on the system. The configuration file on the TPS (AMW) node.	Select the target, enter the path and file name, then press <ENTER>. **ATTENTION** For the TPS versions, only the file names are entered. **NO** extensions or paths should be specified.
File Read	Read-Only No Access Either (1) The time when the optimizer was installed, or (2) The time when the optimizer files were last read.	Duration: Time it took to read the optimizer files.
Last Exec	Read-Only No Access Starting time of the last optimizer execution (updated at the beginning of each execution).	Duration: Time it took to complete the optimizer execution (updated at the end of each execution). Less than the execution frequency unless the cycle overruns. On an overrun, a counter is incremented, and the next execution is delayed. When the overrun limit is violated, the optimizer shuts down.

RMPCT DQP Detail Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
Optimizer Speed Factor	Target — ENG Controls how fast the optimizer is to drive the Profit Controllers (RMPCTs) toward an optimal economic solution.	The math: $\frac{6 \times \overline{ST}}{OSF} = RES$ Where $\overline{ST}$ = Average settling time of the system OSF = Optimizer speed factor RES = Time to the economic solution (in settling times) Increasing the Optimizer Speed Factor decreases the time to the solution. Example: An Optimizer Speed Factor of 1.0 means you want the optimizer to attempt to reach the optimal solution within six times the average settling time. 2.0 means within three times.
Optimizer Speed Coordination	Target — ENG Coordination factor to handle the different Profit Controller speeds.	The value range is zero to one. 0 = ignore controller speed differences 1 = optimizer moves at slowest controller speed
SS Objective Value	Read-Only — No Access Economic objective function value with projected steady state values.	
Cur Objective Value	Read-Only — No Access Economic objective function value with current CV and MV values	
DQP Engine #	Read-Only — No Access Engine version number.	This is useful for checking that an engine update has been successful.
Number of RMPCTs	Target — ENG Number of Profit Controllers configured for optimization.	Enter the number of Profit Controllers from the off-line design.
Number of BDVs	Target — ENG Number of bridged output disturbance variables configured in the control solutions (in the prediction and control calculations).	Enter the number of bridge DVs from the off-line design.

RMPCT DQP Detail Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
SYSTEM CONFIG Targets	Target EN Displays the Profit Controller point and Bridge DV point configuration screens.	Use the configuration screens for specifying and describing Profit Controllers and BDVs. Select SYSTEM CONFIG target for the variable.
Max Init Intrvls	Reserved	
Max Num Overlps	Target EN The number of allowable consecutive missed optimizer executions, overruns.	A missed execution occurs when the Profit Optimizer is waiting for other optimizers or other tasks to complete. An overlap occurs when calculations (point executions) from one optimizer execution period over run into the next scheduled period.
Init Intrvals	Reserved	
# of Overlaps	Read-Only No Acce Number of consecutive times calculations have over run into the next scheduled period.	When # of Overlaps = Max Num Overlaps, the optimizer shuts down.
# BDV Inputs Bad	Target EN Number of consecutive times a bridge input value can be bad before it is considered BAD.	When critical BDV is set BAD, Profit Optimizer is automatic set OFF.
# BDV Bad Re-Init	Target EN Number of consecutive times a bridge input value can be bad before the bridge input model is initialized.	This value is usually set greater than or equal to the # BDV inputs bad value.
Read Model File	Target • W INIT = Reads in the .YM model file and initialize the bridge model/combined constraints. • W/O INIT = Reads in the .YM model file without initializing the bridge model/combined constraints.	• Use this option to read in a new model from a new off-line design. • You can set only one of the targets.
Read Spec File	Target Reads in the .YS specification file when set.	

RMPCT DQP Detail Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Design Exec Period	Read-Only No Ac The execution period that was used when building the optimizer in the off-line design.	The execution interval used in the off-line design created process dynamics that show up in the process model that the on-line optimizer is using. The execution interval from the off-line design (of the model you loaded on the system) must be the same interval used when the system is control.
Actual Exec Period	Read-Only No Ac The execution period being used by the optimizer.	• When the optimizer is on control, the actual execution period is the same as the design execution period. The only time the period can vary is in simulation. • You can set the execution period in simulations shorter to reduce simulation time, but remember to set the execution of the CV simulation points to match the shorter period.

Application Notes

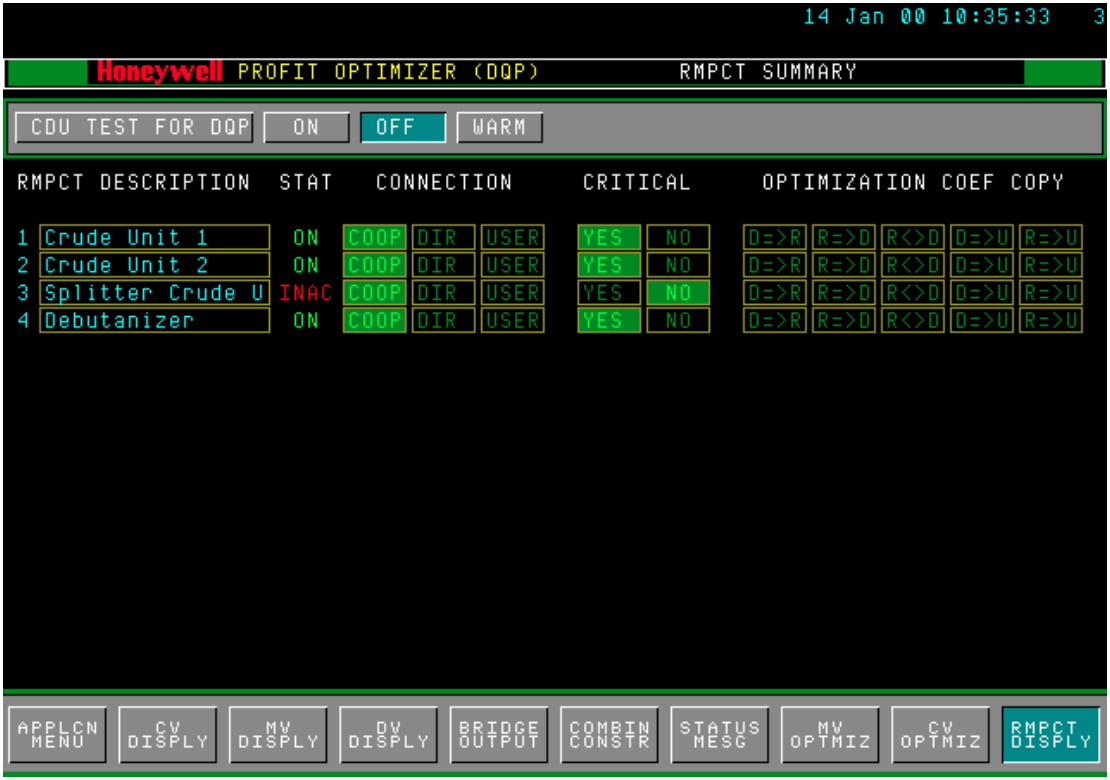
To display a descriptive message about a parameter and its CDS location, touch the parameter name (the field, not the target). Press **CLR** to clear the message.

2.4 RMPCT Summary Display

Sample Screen

Figure 2-2 shows a sample Profit Optimizer's RMPCT Summary screen. Your display will show different information about the optimizer.

Figure 2-2 RMPCT Summary screen



Using the Screen

To display this screen from any Profit Optimizer display, touch [RMPCT DISPLAY] Menu Bar.

Table 2-1 RMPCT Summary

Use the RMPCT Summary Screen for These Tasks . . .	
Operator	**Engineer**
	• Copying and exchanging Optimization Coefficients. • Changing connection types • Setting Critical Controllers

Field Descriptions

Table 2-2 RMPCT Summary –Understanding the Fields and Using the Targets

RMPCT DQP Summary Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
RMPCT	Target OPER Profit Controller (RMPCT) number	
DESCRIPTION	Target ENG Description of the controller, typically the name of the process unit or section.	
STAT	View Only ENG Status of the RMPCT	
CONNECTION	Target ENG Connection type	COOP = Cooperative Connection DIR = Direct Connection USER = User-Specified Connection
CRITICAL	Target ENG .Yes / No	
OPTIMIZATION COEF COPY	Target ENG Copy / Exchange Optimization Coef's	D => R - Copy from DQP to RMPCT R => D - Copy from RMPCT to DQP R <> D - Exchange DQP with RMPCT D => U - Copy from DQP to R => U - Copy from RMPCT to

Application Notes

If any critical RMPCT is turned OFF or WARM, Profit Optimizer (DQP) will be turned from ON to OFF.

Section 3 – Displaying and Using the Summary Screens

3.1 Overview

In This Section

This section shows sample Summary displays, explains the fields, and tells you how to work the screens. Read this section to find out how to:

- Display the CV, MV, DV, BDV, and CC Summary screens
- Read the fields and use the targets to make control changes
- Set combined constraints operating ranges
- Enter combined constraints setpoints
- Display the CV, MV, DV, BDV, and CC Detail screens.

Optimizer Summaries

Optimizer summary information is the operating information about a variable: what the variable should be doing, what the variable is actually doing, and what the variable is predicted to do.

- **CV Summary** The CV summary display lists all of the CVs, showing status, operating values, and limits.
- **MV Summary** The MV summary display lists all of the MVs, showing status, operating values, and limits.
- **DV Summary** The DV summary display lists all of the DVs, showing status and current value.
- **Bridge DV Summary** The bridge output summary display lists all of the bridge output points, showing status, operating values, estimated values, and steady state values.
- **Combined Constraints Summary** The combined constraints summary display lists all of the combined constraints, showing status, operating values, limits, and setpoints.

Fifteen variables display on a screen. Use the page forward button (top right corner) to display the rest of the variables when an application has more than 15.

Control Details

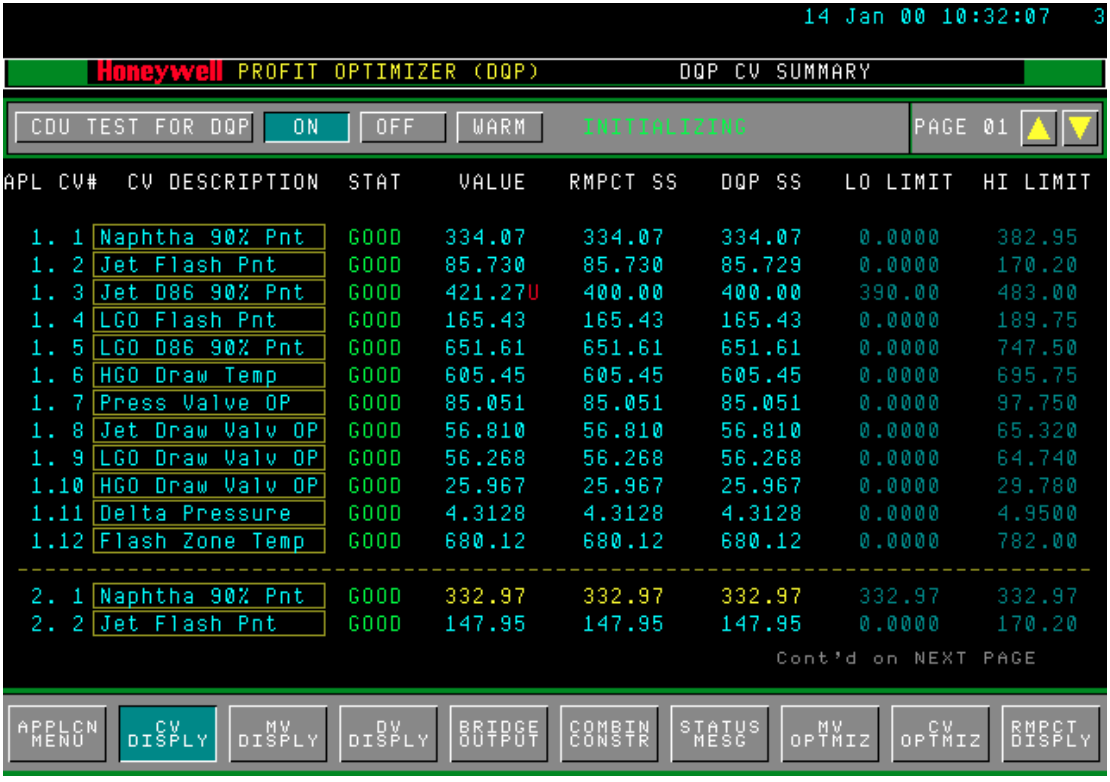
Selecting a variable description on a Summary screen calls the Detail display, which shows the limits, tuning, configuration, and optimization parameters for the variable.

3.2 Profit Optimizer's DQP CV Summary

Sample Screen

Figure 3-1 shows a sample DQP CV Summary screen. Your display will show different descriptions and values. Select a CV description to display the CV Detail.

Figure 3-1 CV Summary Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [CV DISPLY] on the Menu Bar.
- **What You Can Do on This Screen** Table 3-1 describes the control information that displays (see the Field Descriptions for help).

Table 3-1 DQP CV Summary Control Functions

Use the DQP CV Summary Screen for These Tasks . . .
Operator and Engineer
• Displaying every CV in the optimizer. • Displaying the CV descriptions, status, and operating values. • Displaying CV high and low limits.

Field Descriptions

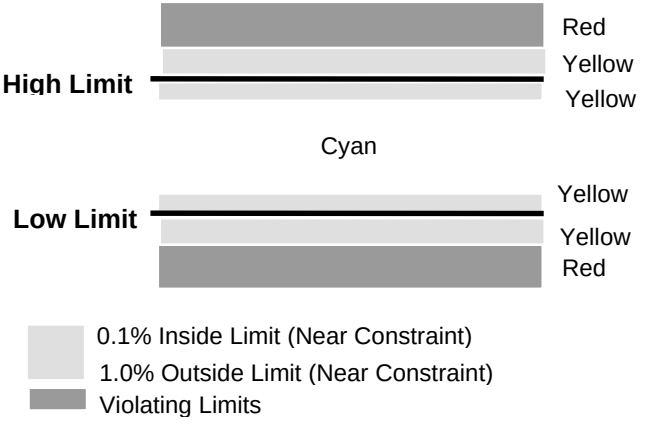
Table 3-2 Profit Optimizer's DQP CV Summary – Understanding the Fields and Using the Targets

Profit Optimizer's DQP CV Summary – Field Descriptions and User Notes		
Field	**Description** Field Type De	**User Notes**
APL	Read-Only The RMPCT application number.	
CV #	Read-Only The CV number within the RMPCT application.	
CV Description	Target Description that characterizes the variable's function or location.	• Select the target to call the CV Detail screen.
Stat	Read-Only Status. GOOD, DROP, PRED, CRIT, INIT, WDUP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Value	Read-Only The value of the CV at the current execution. This can be the measured process value or a predicted value.	• Dashes display when the source value is bad or unavailable for longer than the number of bad values allowed. See the Detail display [# OF BAD READS ALLOWED]. • See the Detail display for the [SOURCE] point of this value. <u>Values Display In Color</u> • Cyan = Measured value is within limits. • Yellow = Measured value is near limits. • Red = Measured value is violating limits. • Half Cyan = Predicted value is to be within limits. • Half Yellow = Predicted value is to be near limits. • Half Red = Predicted value is to violate limits.

Profit Optimizer's DQP CV Summary – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
RMPCT SS, DQP SS	Read-Only — No Access This column displays the RMPCT and Profit Optimizer (DQP) predicted steady state values.	Values Display In Color • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits. • Red = Predicted to violate limits. See Application Notes for an illustration.
Lo Limit	Read-Only — No Access Low end of the operating range.	
Hi Limit	Read-Only — No Access High end of the operating range.	

Application Notes

In Profit Optimizer, this is what *near limits* means and how colors display for predicted CV values that are within limits, near limits, and outside limits:

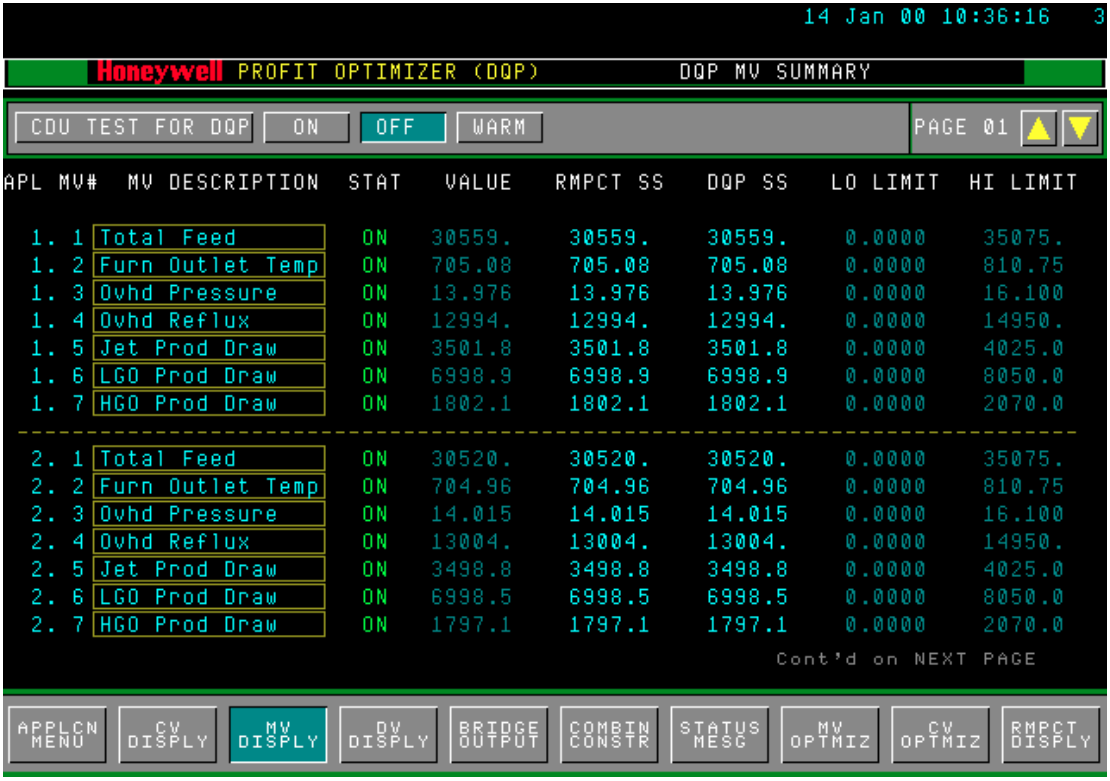


3.3 Profit Optimizer's DQP MV Summary

Sample Screen

Figure 3-2 shows a sample Profit Optimizer's DQP MV Summary screen. Your display will show different descriptions and values. Select a Profit Optimizer MV description to display the Profit Optimizer's DQP MV Summary.

Figure 3-2 Profit Optimizer's DQP MV Summary



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [MV DISPLY] on the Menu Bar.
- **What You Can Do on This Screen** Table 3-3 describes the control information that displays (see the Field Descriptions for help).

Table 3-3 Profit Optimizer's DQP MV Summary Control Functions

Use the Profit Optimizer's DQP MV Summary Screen for These Tasks . . .
Operator and Engineer
• Displaying every MV in the optimizer. • Displaying the MV descriptions, status, and operating values. • Displaying MV high and low limits.

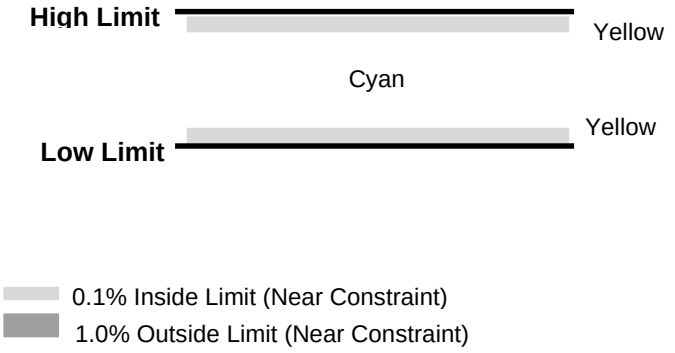
Field Descriptions

Table 3-4 Profit Optimizer's DQP MV Summary – Understanding the Fields and Using the Targets

Profit Optimizer's DQP MV Summary – Field Descriptions and User Notes		
Field	**Description** Field Type / Default Access	**User Notes**
APL	Read-Only / No Access The RMPCT application number.	
MV #	Read-Only / No Access The MV number within the RMPCT application.	
MV Description	Target / OPER Description that characterizes the variable's function or location.	• Select the target to call the MV Detail screen.
Stat	Read-Only / No Access Status. ON, FFWD, HIGH, LOW, SERV, INIT, or INAC.	• Whether the MV is dropped or used as a feedforward value is set on the MV Detail display. • See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Value	Read-Only / No Access The value of the MV at the current execution.	
RMPCT SS, DQP SS	Read-Only / No Access This column displays the predicted RMPCT and Profit Optimizer (DQP) steady state values.	Values Display In Color • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits. • See Application Notes for an illustration.
Lo Limit	Read-Only / No Access Low end of the operating range. The lowest acceptable value.	
Hi Limit	Read-Only / No Access High end of the operating range. The highest acceptable value.	

Application Notes

In Profit Optimizer, this is what *near limits* means and how colors display for predicted MV values that are within limits or near limits:

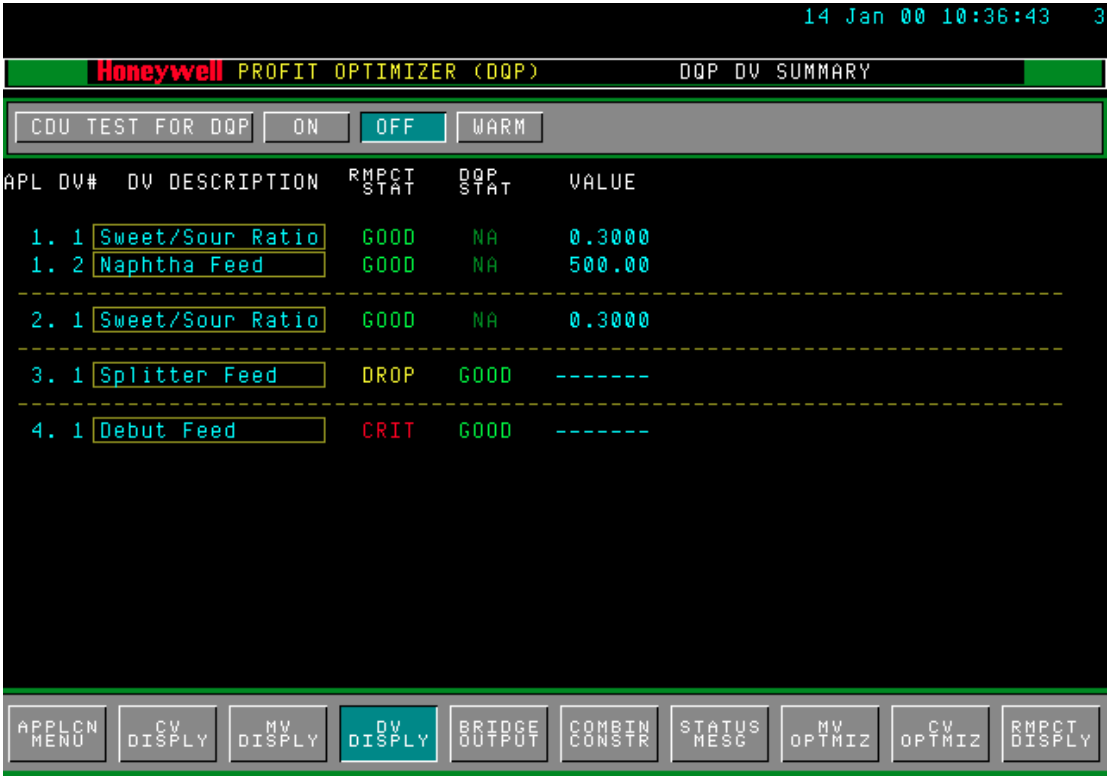


3.4 Profit Optimizer's DQP DV Summary

Sample Screen

Figure 3-3 shows a sample Profit Optimizer's DQP DV Summary screen. Your display will show different descriptions and values. Select a DV description to display the DV Detail.

Figure 3-3 Profit Optimizer's DQP DV Summary Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [DV DISPLY] on the Menu Bar.
- **What You Can Do on This Screen** Table 3-5 describes the control information that displays on the Profit Optimizer's DQP DV Summary screen.

Table 3-5 Profit Optimizer's DQP DV Summary Control Functions

Use the Profit Optimizer's DQP DV Summary Screen for These Tasks . . .
Operator and Engineer
• Displaying every DV in the optimizer. • Displaying the DV descriptions, status, and operating values.

Field Descriptions

Table 3-6 Profit Optimizer's DQP DV Summary – Understanding the Fields and Using the Targets

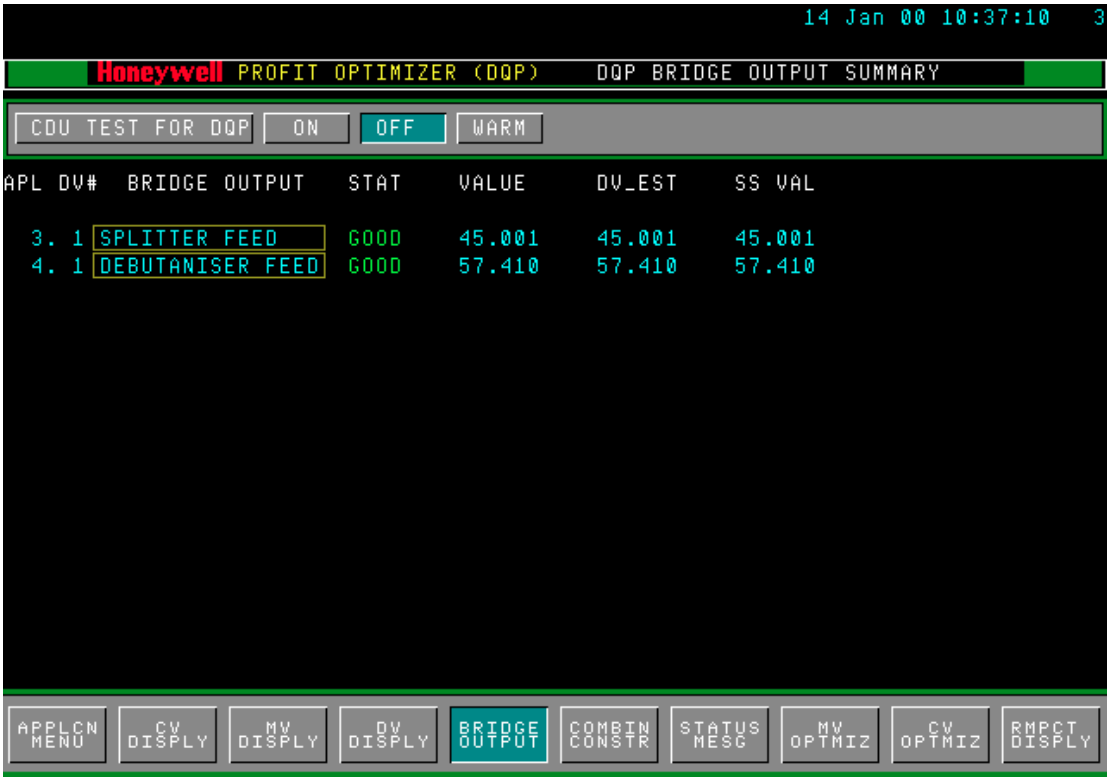
Profit Optimizer's DQP DV Summary – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
APL	Read-Only No Access The RMPCT application number.	
DV #	Read-Only No Access The DV number within the RMPCT application.	
DV Description	Target OPER Description that characterizes the variable's function or location.	• Select the target to call the DV Detail screen.
RMPC Stat, DQP Stat	Read-Only No Access Status. GOOD, CRIT, DROP, INAC, or.NA	• The optimizer shuts down (OFF) when a critical DV goes bad. • See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Value	Read-Only No Access The value of the DV at the current execution.	

3.5 Profit Optimizer's DQP Bridge Output Summary

Sample Screen

Figure 3-4 shows a sample Profit Optimizer's DQP Bridge Output Summary screen. Your display will show different descriptions and values. Select a Bridge Output description to display the Bridge Output Detail.

Figure 3-4 Profit Optimizer's DQP Bridge Output Summary Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [BRIDGE OUTPUT] on the Menu Bar.
- **What You Can Do on This Screen** Table 3-6 describes the control information that displays on the Profit Optimizer's DQP Bridge Output Summary screen.

Table 3-6 Profit Optimizer's DQP Bridge Output Summary Control Functions

Use the Profit Optimizer's DQP Bridge Output Summary Screen for These Tasks . . .
Operator and Engineer
• Displaying every bridge output in the optimizer. • Displaying the bridge output descriptions, status, and operating values.

Field Descriptions

Table 3-6 Profit Optimizer's DQP Bridge Output Summary – Understanding the Fields and Using the Targets

Profit Optimizer's DQP Bridge Output Summary – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
APL	Read-Only — No Access The RMPCT application number.	
DV #	Read-Only — No Access The DV number within the RMPCT application.	
Bridge Output	Target — OPER Description that characterizes the variable's function or location.	• Select the target to call the Bridge DV Detail screen.
Stat	Read-Only — No Access Status. GOOD, CRIT, DROP, or INAC.	• The optimizer shuts down (OFF) when a critical bridge DV goes bad. • See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Value	Read-Only — No Access The value of the bridge DV at the current execution.	
DV_EST	Read-Only — No Access The estimated value of the bridge DV at the current execution.	
SS Val	Read-Only — No Access The steady state value of the bridge DV.	

3.6 Profit Optimizer's DQP Combined Constraint Display

Sample Screen

Figure 3-5 shows a sample of Profit Optimizer's DQP Combined Constraint screen. Your display will show different descriptions and values. Select a combined constraint description to display the Combined Constraint Detail.

Figure 3-5 Profit Optimizer's DQP Combined Constraint



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [COMBIN CONSTR] on the Menu Bar.
- **What You Can Do on This Screen** Table 3-7 describes the control information that displays and the control changes that you can make from the Profit Optimizer Combined Constraint screen (see the Field Descriptions for help):

Table 3-7 Profit Optimizer's DQP Combined Constraint Control Functions

Use the Profit Optimizer's DQP Combined Constraint Screen for These Tasks . . .
Operator and Engineer
• Displaying every combined constraint in the optimizer. • Displaying the combined constraint descriptions, status, and operating values. • Displaying and setting combined constraint high and low limits. • Displaying and setting the combined constraint setpoints.

Field Descriptions

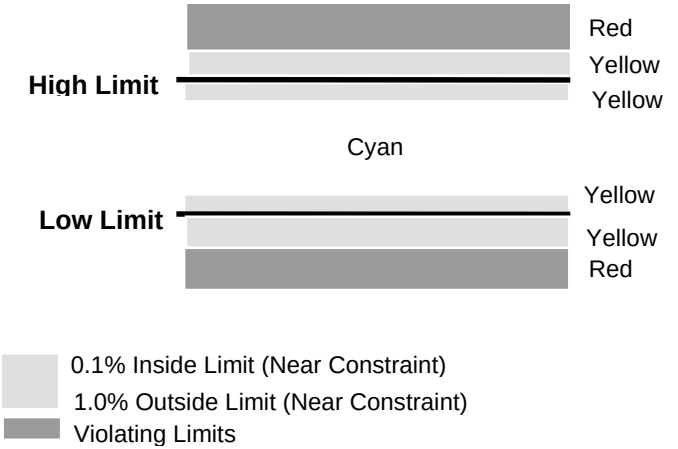
Table 3-2 Profit Optimizer's DQP Combined Constraint – Understanding the Fields and Using the Targets

Profit Optimizer's DQP Combined Constraint – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Comb Constraints	Target OPER Description that characterizes the variable's function or location.	• Select the target to call the Combined Constraint Detail screen.
Stat	Read-Only No Access Status. GOOD, DROP, PRED, CRIT, INIT, WDUP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Value	Read-Only No Access The value of the combined constraint at the current execution.	Values Display In Color • Cyan = Measured value is within limits. • Yellow = Measured value is near limits. • Red = Measured value is violating limits. • Half Cyan = Predicted value is to be within limits. • Half Yellow = Predicted value is to be near limits. • Half Red = Predicted value is to violate limits.
SS Val	Read-Only No Access This column displays the Profit Optimizer predicted steady state values.	Values Display In Color • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits. • Red = Predicted to violate limits. See Application Notes for an illustration.
Lo Limit	Target ENG Low end of the operating range.	
Hi Limit	Target ENG High end of the operating range.	

Profit Optimizer's DQP Combined Constraint – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Setpoint	Target ENG Operating target of the combined constraint.	• Targets here are invisible. Select in the Setpoint column to make an entry. • Leaving the field blank lets the combined constraint vary within the operating range.

Application Notes

In Profit Optimizer, this is what *near limits* means and how colors display for predicted combined constraint values that are within limits, near limits, and outside limits:



Section 4 – Displaying and Using the Detail Screens

4.1 Overview

In This Section

This section shows sample Detail displays, explains the fields, and tells you how to work the screens. The Detail displays complement the Summary displays described in Section 3. Read this section to find out how to:

- Display the CV, MV, DV, BDV, and CC Detail screens
- Read the fields and use the targets to make control changes
- Set CV, MV and CC operating ranges
- Enter CC setpoints
- Change the control mode of non critical MVs
- Display the regulatory Point Detail for a variable and its output destination point.

Target Access Levels

For safety considerations, many targets on the Detail displays require the ENG key.

Paging through Detail Screens

Detail displays are called from the Summary screens by selecting the variable descriptions.

You can page through Detail screens (1) By selecting the directional targets at the upper right of the display, or (2) By pressing the paging keys on the operator console. Paging lets you view the Details for any variable without having to return to the Summary displays to make selections.

Displaying the Point Detail Pages

Pressing a tag name or destination point name on any Profit Optimizer Detail screen displays the Point Detail pages for the point.

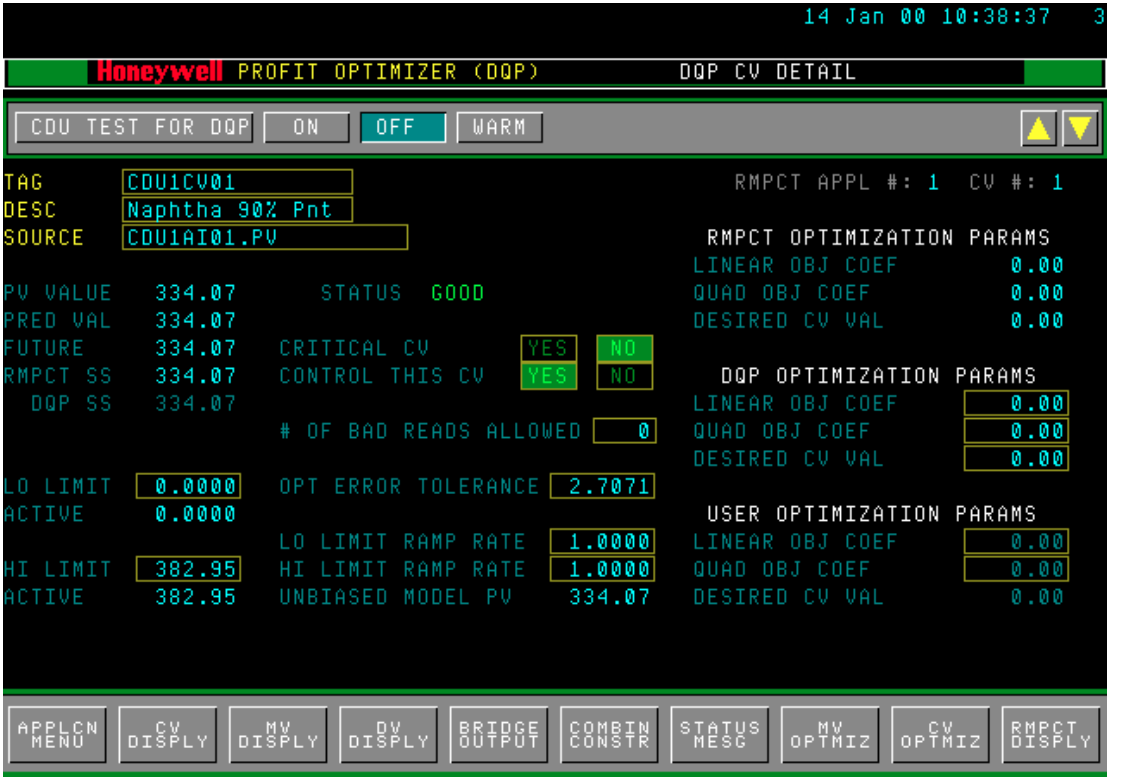
You can always get to the Point Detail pages by pressing <DETAIL> on the operator console, then entering the point name or [ENTER].

4.2 Profit Optimizer's DQP CV Detail Display

Sample Screen

Figure 5-1 shows a sample Profit Optimizer's DQP CV Detail screen. Your display will show different point names and values.

Figure 5-1 Profit Optimizer's DQP CV Detail Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** On the CV Summary, touch a variable description.
- **What You Can Do on This Screen** Table 5-1 describes the information that displays and the control and tuning parameters that can be set from the Profit Optimizer CV Detail screen.
- **Paging through Detail Screens** Select the directional targets on the display (upper right corner), or press the <PAGE BACK> and <PAGE FWD> keys on the operator console. Profit Optimizer CV Detail pages cycle in the same order as the CVs are listed on the Summary display.

Table 5-1 Profit Optimizer's DQP CV Detail Control Functions

Use the Profit Optimizer's DQP CV Detail Screen for These Tasks . . .	
Operator	**Engineer**
• Displaying the CV status and operating values. • Setting CV high and low limits. • Select [TAG] to see the Point Detail pages for the CV interface point. • Select [SOURCE] to see the Point Detail pages for the point providing the process value used by the controller. • Turning non critical CVs ON and OFF. • Displaying the current and predicted PV values. • Displaying the CV predicted future and steady state values, unbiased model PV, and the scaling factor.	• Describing the CV. • Setting critical or non critical CV control, and turning control ON and OFF. • Setting CV ramp rates and error tolerance. • Setting the desired CV resting value. • Setting CV performance ratios and economic functions.

Field Descriptions

Table 5-2 Profit Optimizer's DQP CV Detail – Understanding the Fields and Using the Targets

Profit Optimizer's DQP CV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Tag	Target OPER Tag name. The name of the Profit Controller (RMPCT) CV interface display point.	Select the target to call the Point Detail pages.
Desc	Target ENG Description that characterizes the variable's function or location.	To re-describe the variable, touch the target, type the new description, press <ENTER>.
Source	Target OPER The name of the point-dot-parameter providing the process value used by the optimizer.	Select the target to call the Point Detail pages.
PV Value	Read-Only No Access The value of the CV at the current execution.	Dashes display when the source value is bad or unavailable for longer than the [# OF BAD READS ALLOWED].

Profit Optimizer's DQP CV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type / Default Access	**User Notes**
Pred Val	Read-Only / No Access The predicted value of the CV at the current execution. This value includes bias.	• For CVs with a periodic [UPDATE FREQUENCY], such as analyzer values, predicted values are used until new values are available. • For non critical CVs, predicted values are used when the PV is bad or unavailable for ≤ the [# of BAD READS ALLOWED].
Future	Read-Only / No Access Predictions are to the end of the control funnel, which is roughly three times the nominal settling time, plus delay.	
RMPCT SS DQP SS	Read-Only / No Access Predictions are to steady state for the Profit Controller and the Profit Optimizer (DQP).	For controller purposes, the steady state horizon is six times the natural settling time. Values Display In Color . . . • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits. • Red = Predicted to violate limits (>1% beyond limit).
Lo Limit	Target / OPER Low end of the operating range. The lowest acceptable value.	
Active	Read-Only / No Access The low limit value that the controller is using at this execution.	• This parameter keeps the controller from over-reacting to what it would otherwise perceive as a continued limit violation while ramping to a new limit. • Unless the controller is actively ramping the CV, this value is the same as the low limit. • Active limits π Hi/Lo limits when [CONTROL THIS CV] = NO.
Hi Limit	Target / OPER High end of the operating range. The highest acceptable value.	

Profit Optimizer's DQP CV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Active	Read-Only No Access The high limit value that the controller is using at this execution.	• This parameter keeps the controller from over-reacting to what it would otherwise perceive as a continued limit violation while ramping to a new limit. • Unless the controller is actively ramping the CV, this value is the same as the high limit. • Active limits π Hi/Lo limits when [CONTROL THIS CV] = NO.
Status	Read-Only No Access GOOD, DROP, PRED, CRIT, INIT, WDUP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Critical CV	Target ENG • YES = CV is critical. • NO = CV is not critical.	The optimizer shuts down (OFF) when critical CVs go bad (are not available).
Control This CV	Target OPER • YES = Use this CV in the control solution. • NO = CV is dropped, disregarded in the control solution.	
# of Bad Reads Allowed	Target ENG The number of consecutive bad values allowed: • A predicted value is used for bad values up to the number of bad reads allowed. • Bad values display as - - - - - dashes, and the CV shows a yellow PRED status. **When allowed bad reads are exceeded:** • Critical CVs – Optimizer shuts down, and CV shows a red CRIT status. • Non Critical CVs – CV is dropped and shows a yellow DROP status.	**WARNING** Running the optimizer with bad values can have serious consequences. Do not set this parameter >1 unless you are thoroughly familiar with your process.
Opt Error Tolerance	Target ENG The allowable deviation past the low or high limit before optimization halts and constraint handling begins.	

Profit Optimizer's DQP CV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Lo Limit Ramp Rate	Target ENG Sets the rate at which the Active low limit ramps to meet a new [LO LIMIT].	• Whenever the Active low limit is below the Operator-set low limit, the Active limit ramps to the new limit by the specified rate at each execution. • Ramping occurs when the low limit is raised or the setpoint is changed.
Hi Limit Ramp Rate	Target ENG Sets the rate at which the Active high limit ramps to meet a new [HI LIMIT].	• Whenever the Active high limit is above the Operator-set high limit, the Active limit ramps to the new limit by the specified rate at each execution. • Ramping occurs when the high limit is lowered or the setpoint is changed.
Unbiased Model PV	Read-Only No Access The uncorrected, raw, predicted value. The value without a mathematical bias applied.	To get an idea of the accuracy of your model, trend the unbiased model PV against the actual PV.
RMPCT Appl #	Read-Only No Access The Profit Controller (RMPCT) application number associated with the optimizer.	
CV #	Read-Only No Access The RMPCT CV.	
Linear Obj Coef	Target ENG Linear objective coefficient. An optimization parameter.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User
Quad Obj Coef	Target ENG Quadratic objective coefficient. An optimization parameter.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User
Desired CV Val	Target ENG Desired resting value for the CV during quadratic optimization.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User (view only)

Application Notes

The following information can help you use the Profit Optimizer's DQP CV Detail

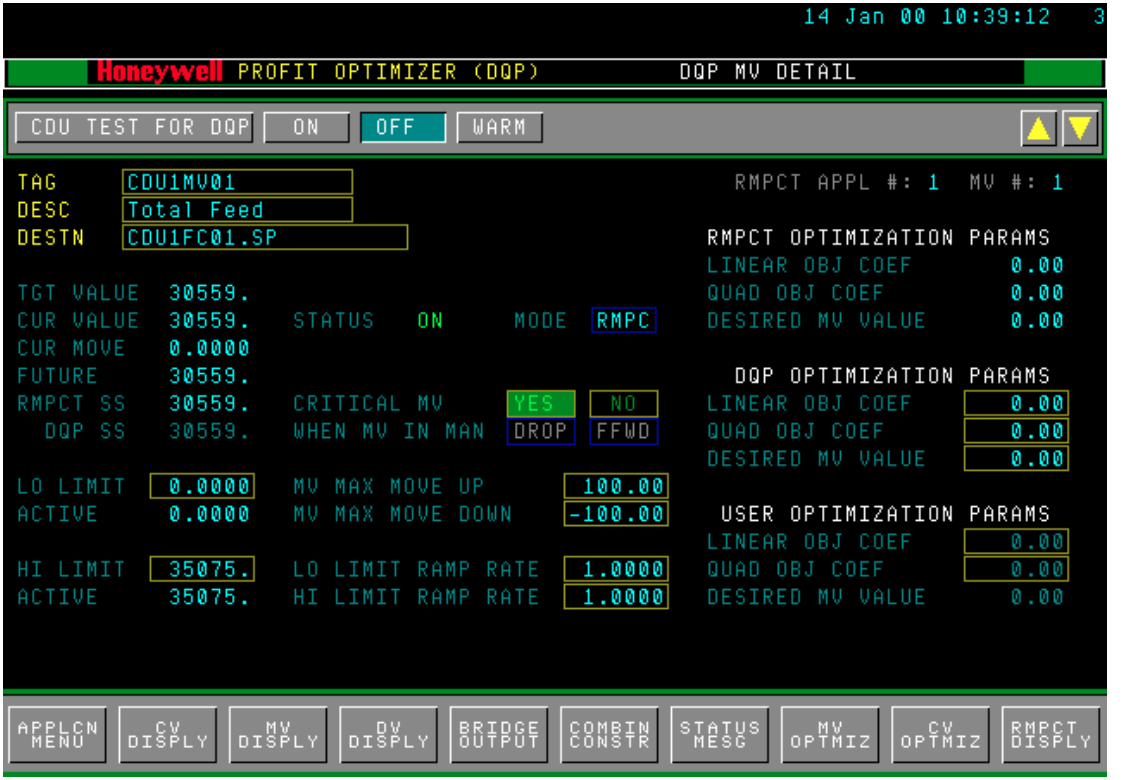
- See Application Notes for the CV or MV Summary displays in Section 4 to see how Profit Optimizer defines *near limits* for predicted values.
- For a descriptive message about a parameter and its CDS location, touch the parameter name (the field, not the target). Select **CLR** to clear the message.

4.3 Profit Optimizer's DQP MV Detail Display

Sample Screen

Figure 5-2 shows a sample Profit Optimizer's DQP MV Detail Display. Your display will show different point names and values.

Figure 5-2 Profit Optimizer's DQP MV Detail Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** On the MV Summary, touch a variable description.
- **What You Can Do on This Screen** Table 5-3 describes the information that displays and the control and tuning parameters that can be set from the Profit Optimizer's DQP MV Detail screen.
- **Paging through Detail Screens** Select the directional targets on the display (upper right corner), or press the <PAGE BACK> and <PAGE FWD> keys on the operator console. Profit Optimizer MV Detail pages cycle in the same order as the MVs are listed on the Summary display.

Table 5-3 Profit Optimizer's DQP MV Detail Control Functions

Use the Profit Optimizer's DQP MV Detail Screen for These Tasks . . .	
Operator	**Engineer**
• Displaying the MV status and operating values. • Setting MV high and low limits. • Select [TAG] to see the Point Detail pages for the MV. • Select [DESTN] to see the Point Detail pages for the downstream point Profit Optimizer is writing to. • Toggling RMPC and OPR modes for non critical MVs. • Displaying the MV predicted future and steady state values. • Displaying the current and predicted MV values.	• Describing the MV. • Dropping MVs or using as feedforward control. • Setting critical or non critical MV control. • Setting MV ramp rates. • Setting maximum MV moves per execution. • Entering the desired MV resting value. • Setting MV economic objective functions.

Field Descriptions

Table 5-4 Profit Optimizer's DQP MV Detail – Understanding the Fields and Using the Targets

Profit Optimizer's DQP MV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Tag	Target OPER Tag name. The name of the RMPCT MV Interface display point.	Select the target to call the Point Detail pages.
Desc	Target ENG Description that characterizes the variable's function or location.	To re-describe the variable, touch the target, type the new description, press <ENTER>.
Destn	Target OPER Destination point. The downstream MV (the downstream controller) receiving the dot-SP or dot-OP control instruction from Profit Optimizer.	Select the target to call the Point Detail pages for the downstream point Profit Optimizer is writing to.
Tgt Value	Read-Only No Access The value sent to the SP or OP of the MV at the current execution.	
Curr Value	Read-Only No Access The value of the MV at the current execution.	
Curr Move	Read-Only No Access The size and direction of change made to the immediate downstream controller at the last execution.	The change is made to the point parameter named in [DESTN].

Profit Optimizer's DQP MV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
Future	Read-Only — No Access Predictions are to the end of the control funnel, which is roughly three times the nominal settling time, plus delay.	Values Display In Color . . . • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits.
RMPCT SS DQP SS	Read-Only — No Access Predictions are to steady state.	For controller purposes, the steady state horizon is six times the natural settling time. Values Display In Color . . . • Cyan = Predicted to be within limits. • Yellow = Predicted to be near limits.
Lo Limit	Target — OPER Low end of the operating range. The lowest acceptable value.	
Active	Read-Only — No Access The low limit value the controller is using at this execution.	Unless the controller is actively ramping the MV to a new limit, this value is the same as the low limit.
Hi Limit	Target — OPER High end of the operating range. The highest acceptable value.	
Active	Read-Only — No Access The high limit value the controller is using at this execution.	Unless the controller is actively ramping the MV to a new limit, this value is the same as the high limit.
Status	Read-Only — No Access ON, FFWD, HIGH, LOW, SERV, INIT, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Mode	Target — OPER Control mode. Either RMPC or OPR.	• Select the target then press <ENTER> to toggle control between RMPC and OPR. • In OPR, Profit Optimizer stops outputting changes to the downstream controller [DESTN] point. • Target is locked if the MV is critical.
Critical MV	Target — ENG • YES = MV is critical. • NO = MV is not critical.	The optimizer shuts down (OFF) when critical MVs go bad or are unavailable.
When MV In Man	Target — ENG • SERV = Drop from control when the MV is not available. • FFWD = Use as a feedforward value when the MV is not available.	

Profit Optimizer's DQP MV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
MV Max Move Up	Target ENG The largest single move the controller can make at each execution when increasing the MV.	
MV Max Move Down	Target ENG The largest single move the controller can make at each execution when decreasing the MV.	
Lo Limit Ramp Rate	Target ENG Sets the rate at which the Active low limit ramps to meet a new [LO LIMIT].	• Whenever the Active low limit is below the Operator-set low limit, the Active low limit ramps to the new limit. - If the MV is below the Active limit, the MV ramps by the specified rate at each execution. - If the MV is above the Active limit, the MV ramps at 10 times the specified rate. • Ramping occurs when: - Low limit is raised, or - MV is below the Operator-set low limit when the MV is turned ON and [LIM TRACKS VAL] = OFF.
Hi Limit Ramp Rate	Target ENG Sets the rate at which the Active high limit ramps to meet a new [HI LIMIT].	• Whenever the Active high limit is above the Operator-set high limit, the Active high limit ramps to the new limit. - If the MV is above the Active limit, the MV ramps by the specified rate at each execution. - If the MV is below the Active limit, the MV ramps at 10 times the specified rate. • Ramping occurs when: - High limit is lowered, or - MV is above the Operator-set high limit when the MV is turned ON and [LIM TRACKS VAL] = OFF.
RMPCT Appl #	Read-Only No Access The number of the Profit Controllers associated with the optimizer.	
MV #	Read-Only No Access The number of the MVs in the Profit Controller associated with the optimizer.	

Profit Optimizer's DQP MV Detail – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Linear Obj Coef	Target ENG Linear objective coefficient. An optimization parameter.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User
Quad Obj Coef	Target ENG Quadratic objective coefficient. An optimization parameter.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User
Desired MV Value	Target ENG Desired resting value for the MV during quadratic optimization.	There are three different versions of this parameter: • Profit Controller (RMPCT) (view only) • Profit Optimizer (DQP) • User (view only)

Application Notes

The following information can help you use the Profit Optimizer's DQP MV Detail display:

- See Application Notes for the CV or MV Summary displays in Section 4 to see how Profit Optimizer defines *near limits* for predicted values.
- For a descriptive message about a parameter and its CDS location, touch the parameter name (the field, not the target). Select **CLR** to clear the message.

4.4 Profit Optimizer's DV Detail Display

Sample Screen

Figure 5-3 shows a sample DV Detail screen. Your display will show different point names and values.

Figure 5-3 Profit Optimizer's DQP DV Detail Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** On the DV Summary, touch a variable description.
- **What You Can Do on This Screen** Table 5-5 describes the information that displays and the control and tuning parameters that can be set from the Profit Optimizer's DQP MV Detail screen.
- **Paging through Detail Screens** Select the directional targets on the display (upper right corner), or press the <PAGE BACK> and <PAGE FWD> keys on the operator console. DV Detail pages cycle in the same order as the DVs are listed on the Summary display.

Table 4-5 Profit Optimizer's DQP MV Detail Control Functions

Use the Profit Optimizer's DQP MV Detail for These Tasks . . .	
Operator	**Engineer**
• Displaying the DV status and operating values. • Select [TAG] to see the Point Detail pages for the DV interface point. • Select [SOURCE] to see the Point Detail pages for the point providing the process value used by the controller. • Displaying DV values at the current and at the previous execution.	• Describing the DV. • Setting critical or non critical DV control. • Turning non critical DVs ON and OFF.

Field Descriptions

Table 4-6 Profit Optimizer's DQP MV Detail – Understanding the Fields and Using the Targets

DV Detail Display – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
Tag	Target — OPER Tag name. The name of the Profit Controller (RMPCT) DV interface display point.	Select the target to call the Point Detail pages.
Desc	Target — ENG Description that characterizes the variable's function or location.	To redescribe the variable, touch the target, type the new description, press <ENTER>.
Source	Target — OPER The name of the point-dot-parameter providing the process value used by the controller.	Select the target to call the Point Detail pages.
CurrValue	Read-Only — No Access The value of the DV at the current execution.	
Last Val	Read-Only — No Access Value at the previous controller execution.	
RMPCT Appl #	Read-Only — No Access The number of the Profit Controller associated with the optimizer.	
DV #	Read-Only — No Access The number of the DV in the Profit Controller associated with the optimizer.	
RMPCT Status	Read-Only — No Access GOOD, CRIT, DROP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.

DV Detail Display – Field Descriptions and User Notes		
Field	**Description** Field Type / Default Access	**User Notes**
DQP Status	Read-Only / No Access GOOD, CRIT, DROP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions. **WARNING** For bridge DVs, this status should be the same as the Profit Controller status or the optimizer will not work properly.
Critical DV	Target / ENG YES/NO targets specify whether the variable is critical to the controller.	
Use This DV	Target / ENG YES/NO targets indicate whether the variable is used in calculations or dropped.	This target is locked YES when the DV is critical. To remove this DV from control, set the [CRITICAL DV] target NO.

Application Notes

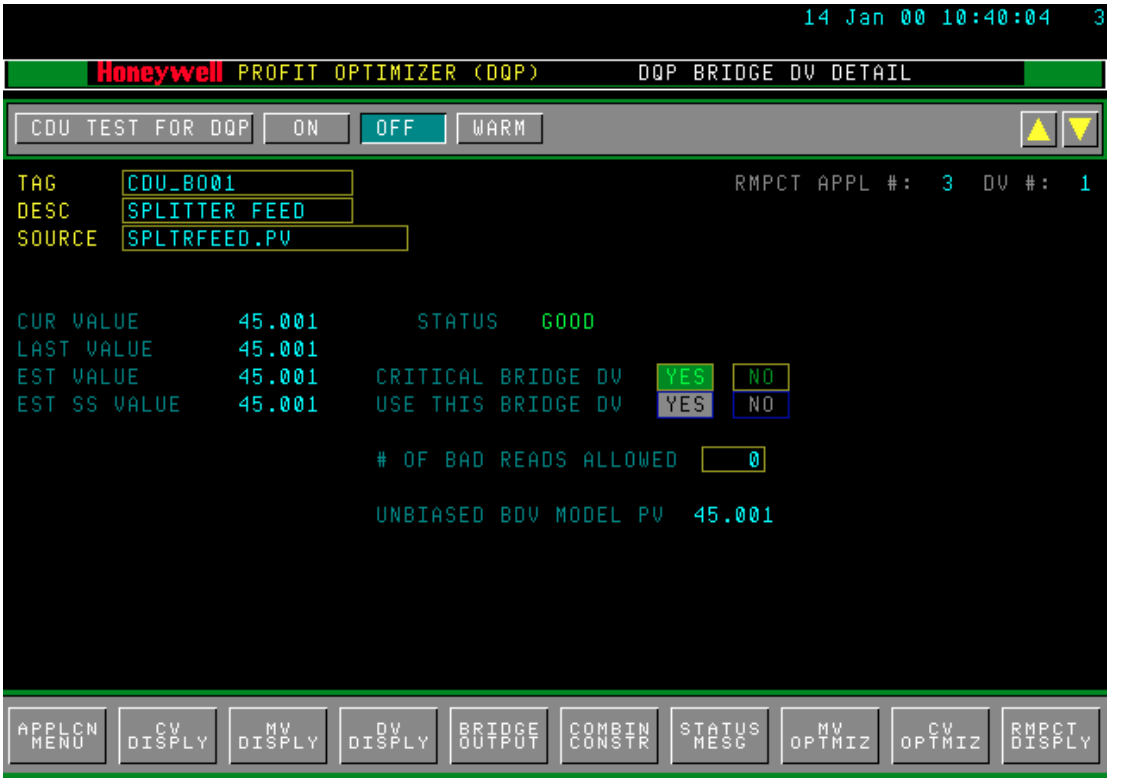
For a descriptive message about a parameter and its CDS location, press the parameter name (the field, not the target). Press **CLR** to clear the message.

4.5 Profit Optimizer's DQP Bridge DV Detail Display

Sample Screen

Figure 4-3 shows a sample Profit Optimizer Bridge DV Detail screen. Your display will show different point names and values.

Figure 4-3 Profit Optimizer's DQP Bridge DV Detail Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** On the Profit Optimizer's DQP Bridge DV Detail, touch a variable description.
- **What You Can Do on This Screen** Table 4-5 describes the information that displays and the control and tuning parameters that can be set from the Profit Optimizer Bridge DV Detail screen.
- **Paging through Detail Screens** Select the directional targets on the display (upper right corner), or press the <PAGE BACK> and <PAGE FWD> keys on the operator console. Profit Optimizer Bridge DV Detail pages cycle in the same order as the Bridge DVs are listed on the Summary display.

Table 4-5 Profit Optimizer Bridge DV Detail Control Functions

Use the Profit Optimizer Bridge DV Detail Screen for These Tasks . . .	
Operator	**Engineer**
• Displaying the Bridge DV status and operating values. • Select [TAG] to see the Point Detail pages for the Bridge Output point. • Select [SOURCE] to see the Point Detail pages for the point providing the process value used by the controller.	• Describing the Bridge DV. • Displaying BridgeDV values at the current and at the previous execution. • Setting critical or non critical bridge DV control. • Turning non critical Bridge DVs ON and OFF.

Field Descriptions

Table 4-6 Profit Optimizer's DQP Bridge DV Detail – Understanding the Fields and Using the Targets

Profit Optimizer's DQP Bridge DV Detail Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Tag	Target OPER Tag name. The name of the bridge output interface point.	Select the target to call the Point Detail pages.
Desc	Target ENG Description that characterizes the variable's function or location.	To redescribe the variable, touch the target, type the new description, press <ENTER>.
Source	Target OPER The name of the point-dot-parameter providing the process value used by the optimizer.	Select the target to call the Point Detail pages.
Cur Value	Read-Only No Access The value of the bridge DV at the current execution.	
Last Value	Read-Only No Access Value at the previous optimizer execution.	
Est Value	Read-Only No Access Best model estimate of the current value excluding the effect of noise.	
Est SS Value	Read-Only No Access Best model estimate of the steady state value excluding the effect of noise.	
RMPCT Appl #	Read-Only No Access The number of the Profit Controller associated with the optimizer.	
DV #	Read-Only No Access The number of the DV in the Profit Controller associated with the optimizer.	

Profit Optimizer's DQP Bridge DV Detail Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Status	Read-Only No Access GOOD, CRIT, DROP, or INAC.	See CV, MV, DV, BDV and CC Statuses in Section 2.2 for status descriptions.
Critical Bridge DV	Target ENG YES/NO targets specify whether the variable is critical to the optimizer.	This should always be YES, unless there are special circumstances.
Use This Bridge DV	Target ENG YES/NO targets indicate whether the variable is used in calculations or dropped.	This target is locked YES when the DV is critical. To remove this DV from control, set the [CRITICAL DV] target NO.
# of Bad Reads Allowed	Target ENG The number of consecutive bad values allowed: • A predicted value is used for bad values up to the number of bad reads allowed. • Bad values display as - - - - - dashes, and the DV shows a yellow PRED status. **When allowed bad reads are exceeded:** • Critical Bridge DVs – Optimizer shuts down, and Bridge DV shows a red CRIT status. • Non Critical Bridge DVs – Bridge DV is dropped and shows a yellow DROP status.	**WARNING** Running the optimizer with bad bridge DV values can have serious consequences. Do not set this parameter >1 unless you are thoroughly familiar with your process.
Unbiased BDV Model PV	Read-Only No Access The uncorrected, raw, predicted value. The value without a mathematical bias applied.	To get an idea of the accuracy of your model, trend the unbiased model DV against the actual DV.

Application Notes

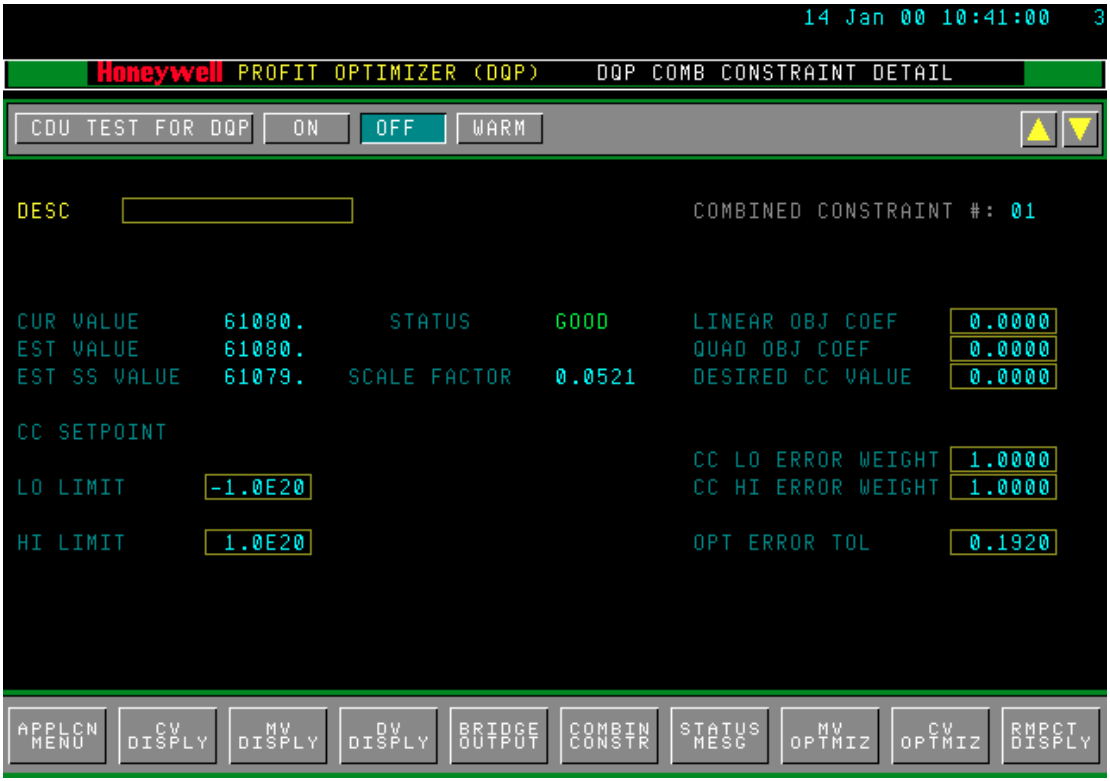
For a descriptive message about a parameter and its CDS location, touch the parameter name (the field, not the target). Select **CLR** to clear the message.

4.6 Profit Optimizer's DQP Comb Constraint Detail Display

Sample Screen

Figure 4-5 shows a sample Profit Optimizer's DQP Combined Constraint Detail screen. Your display will show different point names and values.

Figure 4-5 Profit Optimizer's DQP Comb Constraint Detail Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** On the DQP Comb Constraint, touch a variable description.
- **What You Can Do on This Screen** Table 4-6 describes the information that displays and the control and tuning parameters that can be set from the Profit Optimizer's DQP Comb Constraint Detail screen.
- **Paging through Detail Screens** Select the directional targets on the display (upper right corner), or press the <PAGE BACK> and <PAGE FWD> keys on the console. DQP Comb Constraint Detail pages cycle in the same order as the combined constraints are listed on the Summary display.

Table 4-6 Profit Optimizer's DQP Comb Constraint Detail Control Functions

Use the Profit Optimizer's DQP Comb Constraint Detail Screen for These Tasks . . .	
Operator	**Engineer**
• Displaying the combined constraint status and operating values. • Displaying the current and estimated combined constraint values.	• Describing the combined constraint. • Setting combined constraint high and low limits. • Setting CV ramp rates and error tolerance. • Setting the desired CV resting value. • Setting CV performance ratios and economic functions.

Field Descriptions

Table 4-2 Profit Optimizer's DQP Comb Constraint Detail – Understanding the Fields and Using the Targets

Profit Optimizer's DQP Comb Constraint Detail – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
Desc	Target — ENG Description that characterizes the variable's function or location.	To re-describe the variable, touch the target, type the new description, press <ENTER>.
Cur Value	Read-Only — No Access The value of the combined constraint at the current execution.	Dashes display when the source value is bad or unavailable.
Est Value	Read-Only — No Access The estimated value of the CC at the current execution. This value includes bias.	
Est SS Value	Read-Only — No Access The value of the CC at the estimated economic SS.	
CC Setpoint	Target — ENG Desired value for the combined constraint.	
Lo Limit	Target — OPER Low end of the operating range. The lowest acceptable value.	
Hi Limit	Target — OPER High end of the operating range. The highest acceptable value.	
Status	Read-Only — No Access GOOD or BAD.	See CV, MV,DV, BDV, & CC statuses in section 2.2 for status descriptions
Scale Factor	Read-Only — No Access Factor used to scale the gain matrix to the gain precision.	

Profit Optimizer's DQP Comb Constraint Detail – Field Descriptions and User Notes		
Field	**Description** Field Type — Default Access	**User Notes**
Combined Constraint #	Read-Only — No Access Number of the combined constraint in the optimizer.	
Linear Obj Coef	Target — ENG Linear objective coefficient. An optimization parameter.	
Quad Obj Coef	Target — ENG Quadratic objective coefficient. An optimization parameter.	
Desired CC Value	Target — ENG Desired resting value for the combined constraint during quadratic optimization.	
CC LO Error Weight	Target — ENG Establishes control priorities at low limits when it is physically impossible to keep all combined constraints at setpoint or within a range.	Used in conjunction with the scaling factor. Increasing the weight increases the priority. Combined constraint errors with higher error weights get corrected first.
CC HI Error Weight	Target — ENG Establishes control priorities at high limits when it is physically impossible to keep all combined constraints at setpoint or within a range.	Used in conjunction with the scaling factor. Increasing the weight increases the priority. Combined constraint errors with higher error weights get corrected first.
Opt Error Tol	Target — ENG The allowable deviation past the low or high limit before optimization halts and constraint handling begins.	

Application Notes

The following information can help you use the Profit Optimizer Comb Constraint Detail display:

- See Application Notes for the CV or MV Summary displays in Section 4 to see how Profit Optimizer defines *near limits* for predicted values.
- For a descriptive message about a parameter and its CDS location, touch the parameter name (the field, not the target). Select **CLR** to clear the message.

Section 5 – Displaying and Using the Tuning Screens

5.1 Overview

In This Section

This section shows sample Tuning displays, describes the fields, and explains the target action. Most of the optimization parameters discussed in this section also display on the Profit Optimizer Detail screens discussed in Section 4.

Read this section to find out how to:

- Display the Optimizer CV and MV tuning screens
- Read the displays
- Use targets to make tuning changes.

Optimization Parameters

Optimization parameters are tuning parameters with an economic objective. After the normal operating objectives for the process have been met, the optimization parameters tell the controller what additional moves to make to cut manufacturing costs, increase product, and improve product spec. Use the Optimizer Tuning screens to set the optimization parameters.

Target Access Levels

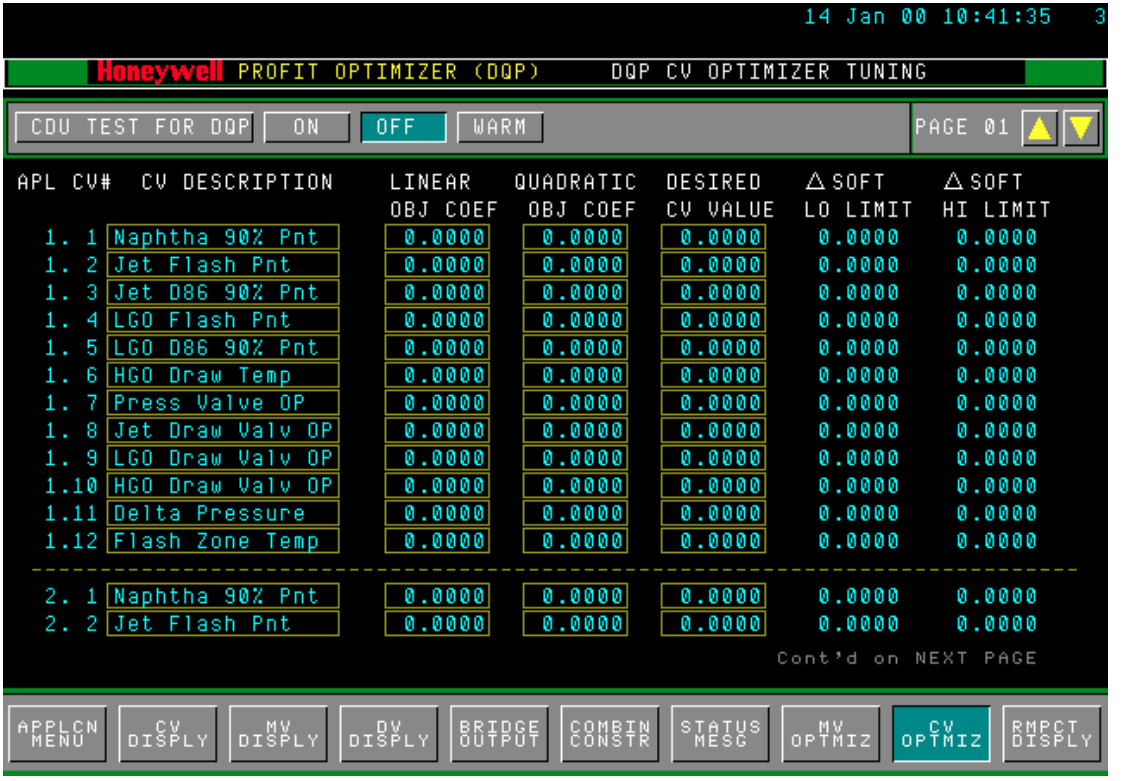
By default, targets on the tuning screens require the ENG key level.

5.2 Profit Optimizer's DQP CV Optimizer Tuning Display

Sample Screen

Figure 5-1 shows a sample Profit Optimizer's DQP CV Optimizer Tuning Display screen. Your display will show different CV descriptions and values.

Figure 5-1 Profit Optimizer's DQP CV Optimizer Tuning Display Display



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [CV OPTMIZ] on the Menu Bar.
- **What You Can Do on This Screen** Table 5-1 describes the tuning changes you can make from the DQP CV Optimizer Tuning Display screen (see the Field Descriptions for help):

Table 5-1 Profit Optimizer CV Optimizer Tuning Functions

Use Profit Optimizer's DQP CV Optimizer Tuning Screen for These Tasks . . .	
Operator	**Engineer**
There are no Operator tasks from this display (default).	• Setting the 1st and 2nd order coefficients that define the economic objectives for the process. • Setting the desired CV resting value

Field Descriptions

Table 5-2 Profit Optimizer's DQP CV Optimizer Tuning Display Understanding the Fields and Using the Targets

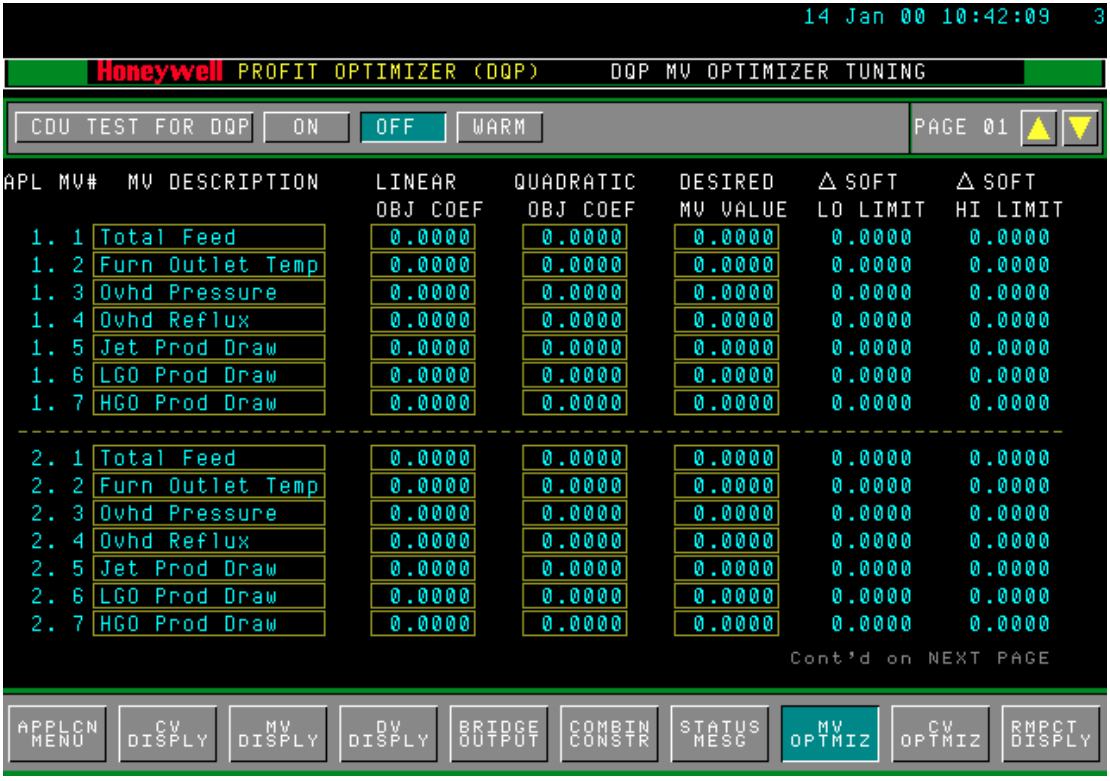
Profit Optimizer's DQP CV Optimizer Tuning – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
APL	Read-Only No Access The Profit Controller (RMPCT) application number	
CV #	Read-Only No Access The CV number within the Profit Controller (RMPCT) Application.	
CV Description	Target OPER Description that characterizes the variable's function or location.	Select the target to call the CV Detail screen.
Linear Obj Coef	Target ENG Linear objective coefficient.	Positive values drives CV to low limit negative values drive CV to high limit
Quadratic Obj Coef	Target ENG Quadratic objective coefficient.	
Desired CV Value	Target ENG Desired resting value for the CV during quadratic optimization.	.
Δ Soft Lo Limit	Read-Only No Access Offset from the control low limit that defines a low limit for optimization.	These values are used down in the Profit Controller and are shown here for information only.
Δ Soft Hi Limit	Read-Only No Access Offset from the control high limit that defines a high limit for optimization.	These values are used down in the Profit Controller and are shown here for information only.

5.3 Profit Optimizer's DQP MV Optimizer Tuning

Sample Screen

Figure 5-2 shows a sample Profit Optimizer's DQP MV Optimizer Tuning screen. Your display will show different MV descriptions and values.

Figure 5-2 Profit Optimizer's DQP MV Optimizer Tuning Screen



Using the Screen

This is how you display this screen, with some notes on what you can do here:

- **To Display This Screen** From any Profit Optimizer screen, touch [MV OPTMIZ] on the Menu Bar.
- **What You Can Do on This Screen** Table 5-3 describes the tuning changes you can make from the MV Optimizer Tuning screen (see the Field Descriptions for help):

Table 5-3 Profit Optimizer's DQP MV Optimizer Tuning Functions

Use the Profit Optimizer's DQP MV Optimizer Tuning Screen for These Tasks . . .	
Operator	**Engineer**
There are no Operator tasks from this display (default).	• Setting the 1st and 2nd order coefficients that define the economic objectives for the process. • Setting the desired MV resting value

Field Descriptions

Table 5-4 Profit Optimizer's DQP MV Optimizer Tuning – Understanding the Fields and Using the Targets

Profit Optimizer's DQP MV Optimizer Tuning – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
APL	Read-Only No Access The Profit Controller (RMPCT) application number	
CV #	Read-Only No Access The CV number within the Profit Controller (RMPCT) Application.	
MV Description	Target OPER Description that characterizes the variable's function or location.	Select the target to call the MV Detail screen.
Linear Obj Coef	Target ENG Linear objective coefficient.	Positive values drives MV to low limit Negative values drive MV to high limit
Quadratic Obj Coef	Target ENG Quadratic objective coefficient.	
Desired MV Value	Target ENG Desired resting value for the MV during quadratic optimization.	
Δ Soft Lo Limit	Read-Only No Access Offset from the control low limit that defines a low limit for optimization.	These values are used down in the Profit Controller and are shown here for information only.
Δ Soft Hi Limit	Read-Only No Access Offset from the control high limit that defines a high limit for optimization.	These values are used down in the Profit Controller and are shown here for information only.

Section 6 – Displaying and Using the Point Description CONFIG Screens

6.1 Overview

Engineers – Read This

This section complements the *Profit Optimizer Installation Reference* and "Point Builder" section of the *APC Toolkit Manual*. See that publication for a discussion of transformation points and their use in a Profit Optimizer application.

For a new optimizer, the Configuration screens are blank (unless installation was done using the EB Builder, or similar template).

Point names **must** be entered in the same point order that was used in the off-line design.

It is acceptable, and recommended, that transformation points have the same description entered on both the Interface Point and the Transformation Point Configuration screens.

In This Section

This section shows sample Configuration displays, explains the fields, and tells you how to work the screens. Read this section to find out how to:

- Call the RMPCT and BDV Configuration displays
- Enter tag names
- Enter point descriptions for the bridge points.

Tag Names and Graphics Descriptions

Tag Names Synonymous with points, or point names, tag names often come directly from, or follow the naming style customary to, piping and instrumentation drawings (P&IDs), which tend to use cryptic naming conventions. P&ID tag names are almost always represented in alpha numeric characters, and they are not always adequately descriptive.

Graphics Descriptions In Profit Optimizer, descriptors are used in addition to the tag name to characterize a point by some recognizable word or phrase, usually to describe the point's location or purpose.

ENG Access

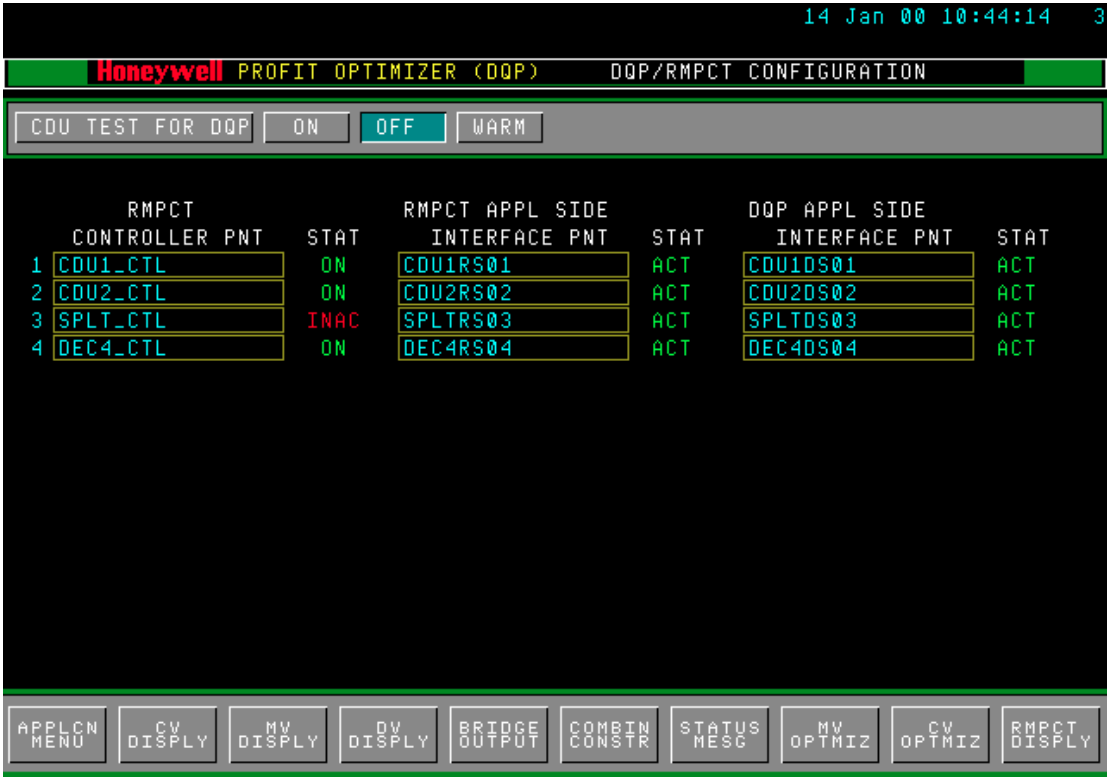
Giving descriptions to tag names typically requires ENG access.

6.2 Profit Optimizer's DQP/RMPCT Configurations

Sample Screen

Figure 6-1 shows a sample Profit Optimizer's DQP/RMPCT Configuration screen. Your displays will show different tag names and descriptions.

Figure 6-1 DQP/RMPCT Configuration Display



Using the Screens

- **To Display the DQP/RMPCT Configuration Screens** Select the optimizer name in the optimizer control bar in the top left corner to open DQP Detail Screen, then touch the number of Profit Controllers (RMPCTs) [SYSTEM CONFIG] target at the upper right of the display.
- **What You Can Do on This Screen** Use this screen to enter Profit Controller, RMPCT side interface, and Profit Optimizer (DQP) side interface point tag names.
- **For OPEN DQP with RMPCT(s) on separate LCN's** For RMPCT(s) which reside on different LCN's than DQP, only fill in the DQP Appl Side Interface Point. Leave the RMPCT Controller Point and RMPCT Appl Side Interface Point blank.

Field Descriptions

Table 6-1 DQP/RMPCT Configuration – Understanding the Fields and Using the Targets

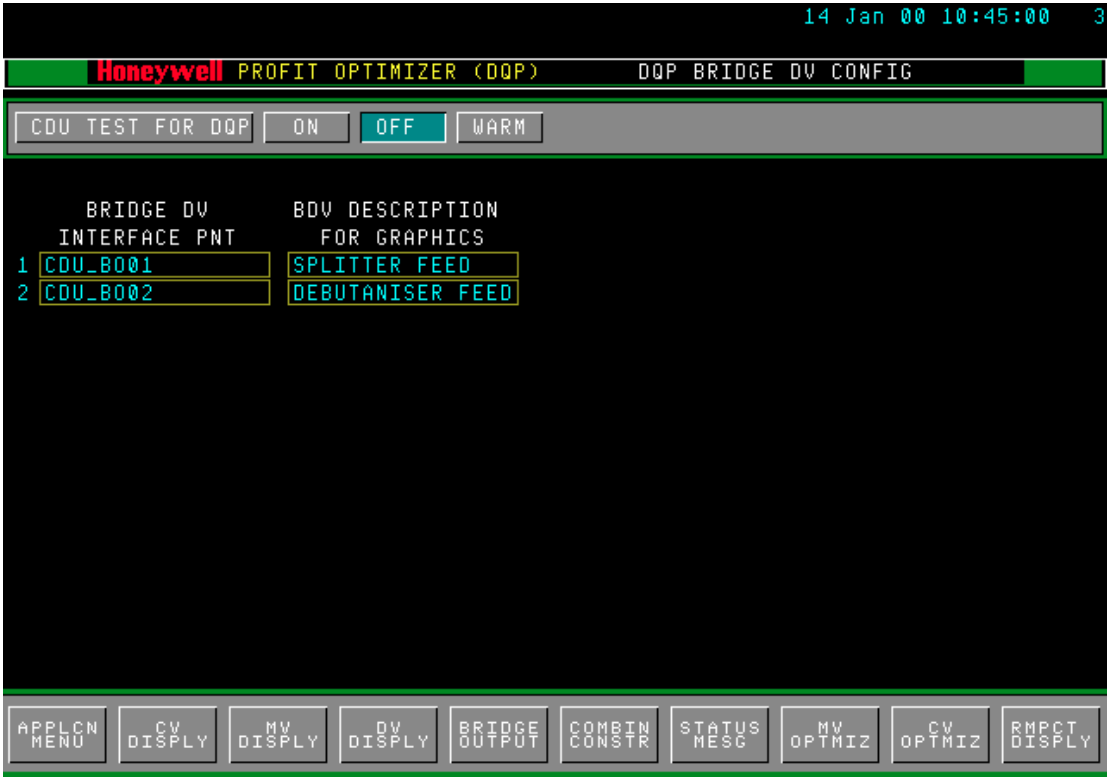
DQP/RMPCT Configuration – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
RMPCT Controller Point	Target ENG Tag names of the Profit Controller points that the optimizer sees.	Optimizer point must be inactive to enter a tagname. For Open installations, leave this entry blank if RMPCT is not on the same LCN as DQP.
RMPCT Appl Side Interface Point	Target ENG The interface point located in the same unit as the Profit Controller point. It is used to transfer data between the controller and the optimizer.	Optimizer point must be inactive to enter a tagname. For Open installations, leave this entry blank if RMPCT is not on the same LCN as DQP.
DQP Appl Side Interface Point	Target ENG The interface point located in the same unit as the Profit Optimizer point. It is used to transfer data between the controller and the optimizer.	Optimizer point must be inactive to enter a tagname. For Open installations, fill this entry in but note that the RMPCT Appl Side Interface Point and DQP Appl Side Interface Point should be blank if RMPCT resides on a different LCN than DQP.

6.3 Profit Optimizer's DQP Bridge DV Config

Sample Screen

Figure 6-2 shows a sample Profit Optimizer's DQP Bridge DV Config screen. Your display will show different tag names and descriptions.

Figure 6-2 Profit Optimizer's DQP Bridge DV Config



Using the Screens

- **To Display the DQP Bridge DV Config Screens** Select the optimizer name in the optimizer control bar in the top left corner to open the DQP Detail Screen, then touch the number of BDVs [SYSTEM CONFIG] target at the upper right of the display.
- **What You Can Do on This Screen** Use this screen to enter Profit Optimizer Bridge DV interface point tag names and descriptions (see the Field Descriptions for help).

Table 6-2 Profit Optimizer Bridge DV Point Configuration – Understanding the Fields and Using the Targets

Profit Optimizer's DQP Bridge DV Config – Field Descriptions and User Notes		
Field	**Description** Field Type Default Access	**User Notes**
Bridge DV Point Tagname	Target ENG Names of the bridge output interface points	
BDV Description for Graphics	Target ENG A description of the variable characterizing its function or location.	To enter a description: 1. INACTIVATE the optimizer point. 2. Select the target. 3. Key in a description. 4. Press <ENTER>.

Section 7 – Displaying and Responding to Profit Optimizer Messages

7.1 Overview

Profit-Optimizer Generated Messages

Profit Optimizer generates three kinds of messages apart from the messages generated by the LCN software: (1) Help messages and error-on-input messages, (2) CDS parameter descriptions, and (3) Software messages (see Figure 7-1).

Some messages are written to the system Message Summary (touch <MSG SUMM> on the console to display).

Profit Optimizer itself does not generate alarms on error. Alarms are handled by the LCN software and the advanced process control design.

Examples

Table 7-1 explains the three kinds of Profit Optimizer messages and tells you where they display.

Table 7-1 Profit Optimizer Operator Messages

Type of Message	Usage	Example Message	Where Messages Display	How to Display
Information about Display Input	1. Gives help or instructions to touch screen or keyboard input. 2. Explains why Profit Optimizer has rejected input.	Enter a New Lo Limit Low Limit Must Be < Than Hi Limit	Upper left screen, above the header.	Select a target.
Information about Profit Optimizer Software	1. Gives the optimizer status or condition. 2. Gives the cause of a software or optimizer error.	Optimizer is active Switch error occurred	• Profit Optimizer messages screen and the Message Journal. • Some messages also go into the Message Summary.	To call the Profit Optimizer messages screen, touch [STATUS MESG] on the Menu Bar from any Profit Optimizer display.
Parameter Descriptions	Describes the CDS parameter (definition and location).	Current value of MV (Param (T1))	Above the Menu Bar on the Profit Optimizer Detail and the CV, MV, and DV, BDV & CCDetail displays.	Select the parameter (field). Press **CLR** on the right of the screen to remove the message.

LCN Hardware and Software Messages

LCN messages communicate TDC 3000 hardware and software errors. These system messages display in the Message Summary. Press <MSG SUMM> on the console to display.

Run Time Messages and Process History

For run time messages and process history, look in the event history journal. The Control Engineer is responsible for configuring the system journal information. This is usually done as part of the advanced process control design.

Controlling Where Messages are Sent

F(1) and F(2) on the controller point can be used to control where most Profit Optimizer messages are sent.

F(1) controls whether messages are sent to the Message Journal; by default, F(1) is ON and messages go to the Message Journal.. F(2) controls whether messages are sent to the Messages Summary; by default, F(2) = OFF.

Some critical messages are not affected by these flags.

Questions? Call TAC

Except for errors that require assistance from Honeywell's Technical Assistance Center (these are pointed out), the message descriptions and suggested responses provided in this section should be enough to remedy most conditions.

Any time you have difficulty understanding a message or isolating and correcting an error, call the Honeywell Technical Assistance Center. The number for the Honeywell Technical Assistance Center appears at the front of this book.

7.2 Message Handling

LCN Message Summary

The Message Summary holds messages about Profit Optimizer until they are acknowledged and cleared by the Operator. (Not all Profit Optimizer messages go into the Summary.)

The <MSG SUMM> button on the console blinks red (and may sound) when there are messages to be acknowledged.

After reading the Message Summary, acknowledge messages by pressing <ACK> on the console. <ACK> does not clear the Summary; it only stops the blinking. To clear a Summary page, press <MSG CLEAR>.

LCN Message Journal

All Profit Optimizer messages are journalized. Display these through the Event History Menu.

Alarms

Profit Optimizer errors are not accompanied by an alarm. Error alarming is configured by the advanced process control design.

7.3 Profit Optimizer Software Messages

Message Levels

Profit Optimizer generates four message levels, each indicating a graduated level of seriousness. Table 7-2 describes the four levels of Profit Optimizer messages.

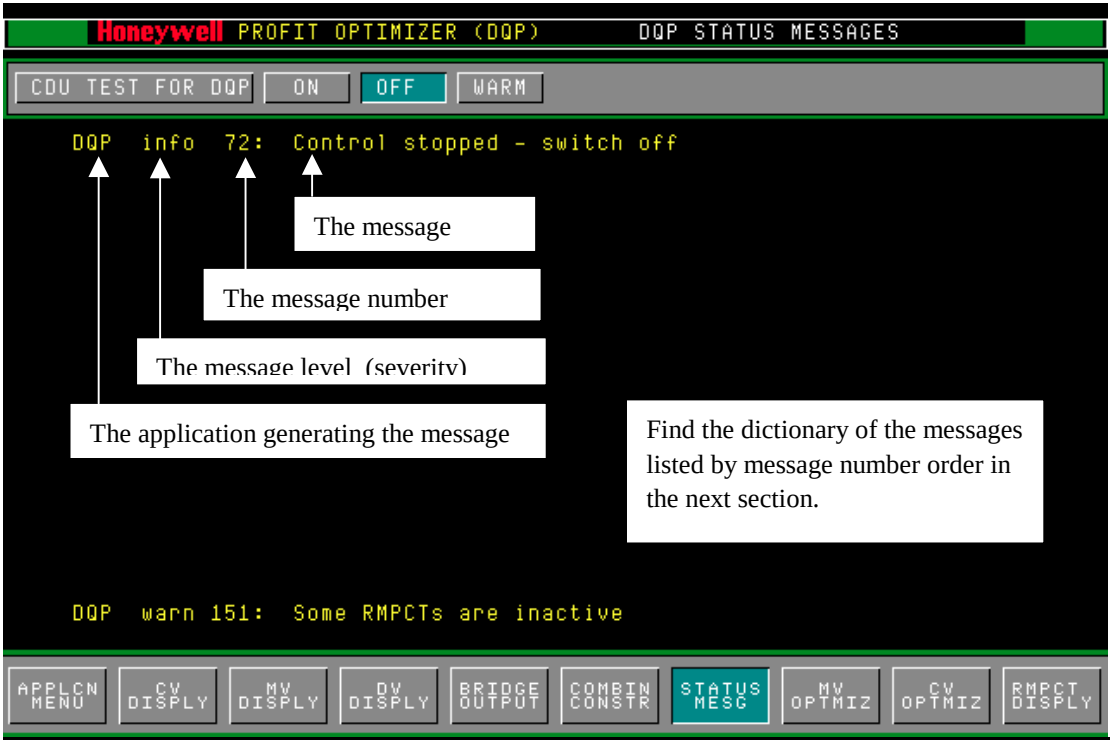
Table 7-2 Profit Optimizer Message Levels

Message Level	Description
Information	No error, information only – usually a reminder, or a comment about the condition of the optimizer.
Warning	An error not serious enough to shut down the optimizer, but the quality of co optimization at the current execution is deteriorated. Intervention can improve optimization, but is not required to keep Profit Optimizer on.
Error	The quality of control is seriously deteriorated. If conditions continue, the optimizer is liable to shut down. Intervention required.
Clear	Notes the correction of an error, or the end of an error-causing condition.

Sample Display

You call Profit Optimizer's DQP Status Message display from the Menu Bar by selecting the [STATUS MESG] button. Figure 7-1 describes the Profit Optimizer's DQP Status Messages

Figure 7-1 Profit Optimizer's DQP Status Messages Display



7.4 Dictionary of Profit Optimizer Messages

How This Dictionary Is Organized

Profit Optimizer generates informational, warning, error, and error clear messages.

This Dictionary describes by message number all of the messages Profit Optimizer generates, explains what they mean to include the probable source of the condition, and gives suggested responses.

Errors requiring technical assistance from Honeywell are noted (TAC, the Honeywell Technical Assistance Center).

Profit Optimizer Messages
1 - 6

1	**Message:** Illegal CDS type	
Error	**Meaning**	**Suggested Response**
	Controller requested pointer for interface CDS other than CV, MV, DV, BDVs DQP-side interface point DMOD_CDS, DIN_CDS, DOUT_CDS.	Call the Honeywell Technical Assistance Center.
2	**Message:** Max DQP points per AM exceeded	
Error	**Meaning**	**Suggested Response**
	Attempt to install more controllers on the AM than are allowed – out of graphic space.	Delete obsolete controllers, or build new controller in a different AM.
3	**Message:** Total number of CVs out of range	
Error	**Meaning**	**Suggested Response**
	Violation of an integrity check. Total number of CVs is greater than: 400 minus number of combined constraints on the AM; 800 minus number of combined constraints on the AxM.	Ensure that number is in the correct range.
4	**Message:** Total number of MVs out of range	
Error	**Meaning**	**Suggested Response**
	Violation of an integrity check. Total number of MVs is either greater than: 200 on the AM; 400 on the AxM.	Ensure that number is in the correct range.
5	**Message:** Total number of DVs out of range	
Error	**Meaning**	**Suggested Response**
	Violation of an integrity check. Total number of DVs is either greater than: 200 on the AM; 400 on the AxM.	Ensure that number is in the correct range.
6	**Message:** Could not get point info ($setup)	
Error	**Meaning**	**Suggested Response**
	Controller could not get information for control point.	Call the Honeywell Technical Assistance Center.

Profit Optimizer Messages 7 - 11

7	**Message**: Could not get DQP master CDS pointer	
Error	**Meaning**	**Suggested Response**
	Controller could not find pointer to the controller point's CDS.	Call the Honeywell Technical Assistance Center.
8	**Message:** Could not get interface CDS pointer	
Error	**Meaning**	**Suggested Response**
	Controller could not find pointer to an interface point CDS.	Call the Honeywell Technical Assistance Center.
9	**Message:** Could not get memory for pool table	
Error	**Meaning**	**Suggested Response**
	Controller could not get memory from heap for pool table.	1. Make sure the AM has adequate memory. 2. Either (1) Delete obsolete points then reactivate the Profit Optimizer control point (set INACTIVE, then ACTIVE), or (2) Build another controller in a different AM. If these responses do not resolve the condition, call the Honeywell Technical Assistance Center.
10	**Message:** Could not get memory for pool	
Error	**Meaning**	**Suggested Response**
	Controller could not get memory from heap for pool data.	1. Make sure the AM has adequate memory. 2. Either (1) Delete obsolete points then reactivate the Profit Optimizer control point (set INACTIVE, then ACTIVE), or (2) Build another controller in a different AM. If these responses do not resolve the condition, call the Honeywell Technical Assistance Center.
11	**Message:** Reserved	
	Meaning	**Suggested Response**

Profit Optimizer Messages 12-18

12	**Message:** RESET without ASSIGN (no FMRB)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block). File are not opening or closing properly, or there are more open files than the HM allows.	Call the Honeywell Technical Assistance Center.
13	**Message:** RESET without ASSIGN (UNASSIGNED)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
14	**Message:** Max files open by background tasks	
Error	**Meaning**	**Suggested Response**
	The total number of files opened by Profit Optimizer and other background tasks exceeds the system maximum.	1. Reschedule background tasks so that fewer run simultaneously, or 2. Move some tasks to a different AM.
15	**Message:** CLOSE without ASSIGN (no FMRB)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block).	Call the Honeywell Technical Assistance Center.
16	**Message:** CLOSE of unopened file	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
17	**Message:** READ_REC without ASSIGN (no FMRB)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block).	Call the Honeywell Technical Assistance Center.
18	**Message:** READ_REC w/o RESET (not OPEN_READ)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.

Profit Optimizer Messages 19-26

19	**Message:** GET_SINGLE without ASSIGN (no FMRB)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block).	Call the Honeywell Technical Assistance Center.
20	**Message:** GET_SINGLE without READ_REC	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
21	**Message:** DEASSIGN without ASSIGN (no FMRB)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block).	Call the Honeywell Technical Assistance Center.
22	**Message:** DEASSIGN without ASSIGN (UNASSIGNED)	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
23	**Message:** GET_INTEGER not in -32768 . . 32767	
Error	**Meaning**	**Suggested Response**
	An integer value in one of the controller definition files is out of range. A controller definition file is probably corrupt.	Rebuild and reload the controller.
24	**Message:** GET_INTEGER input has fraction part	
Error	**Meaning**	**Suggested Response**
	A value that should be an integer has a fractional part in a controller definition file.	Rebuild and reload the controller.
25	**Message:** GET_INTEGER input outside limits	
Error	**Meaning**	**Suggested Response**
	A value in a controller definition file is unreasonable.	Rebuild and reload the controller.
26	**Message:** ASSIGN could not get point info	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.

Profit Optimizer Messages 27-33

27	**Message:** ASSIGN could not get FMRB	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files (File Manager Request Block).	Call the Honeywell Technical Assistance Center.
28	**Message:** ASSIGN could not parse file pathname	
Error	**Meaning**	**Suggested Response**
	The pathname of a controller definition file is incorrect.	Check the .XS and .XM paths on the Controller Detail display.
29	**Message:** RESET could not open file	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
30	**Message:** CLOSE could not close file	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
31	**Message:** READ_REC could not read record	
Error	**Meaning**	**Suggested Response**
	Controller could not read a record in a definition file. The .XS or .XM file from the off-line design is probably corrupt.	1. Read the files back in. 2. If the error continues, write new files, then read these files in. 3. If the error continues, rebuild and reload the controller.
32	**Message:** GET_SINGLE bad slew to next field	
Error	**Meaning**	**Suggested Response**
	Extraneous characters appear in a definition file record.	1. Rebuild XM and XS files and reload the controller, if Err shows on PC. 2. Check setting in text convention.
33	**Message:** GET_SINGLE input is a bad real value	
Error	**Meaning**	**Suggested Response**
	A field in a definition file contains data other than a real value.	1. Rebuild XM and XS files and reload the controller, if Err shows on PC. 2. Check setting in text convention.

Profit Optimizer Messages 34-39

34	**Message:** DEASSIGN could not get point info	
Error	**Meaning**	**Suggested Response**
	Incorrect internal use of files.	Call the Honeywell Technical Assistance Center.
35	**Message:** Could not get memory for data area	
Error	**Meaning**	**Suggested Response**
	Controller could not get memory from heap for a data area.	1. Make sure the AM has adequate memory. 2. Either (1) Delete obsolete points then reactivate the Profit Optimizer control point (set INACTIVE, then ACTIVE), or (2) Build another controller in a different AM. If these responses do not resolve the condition, call the Honeywell Technical Assistance Center.
36	**Message:** Reserved	
	Meaning	**Suggested Response**
37	**Message:** Error in steady state optimizer	
Error	**Meaning**	**Suggested Response**
	An error occurred in the optimization calculations.	This message is accompanied by a second, more error-specific message. See the suggested response for that message number.
38	**Message:** Reserved	
	Meaning	**Suggested Response**
39	**Message:** Did not get past restart	
Error	**Meaning**	**Suggested Response**
	Controller could not initialize.	Call the Honeywell Technical Assistance Center.

Profit Optimizer Messages 40-46

40	**Message:** Bad release of a data area	
Error	**Meaning**	**Suggested Response**
	Heap could not be released (1) when deleting a controller, or (2) prior to reading a new model file.	Call the Honeywell Technical Assistance Center.
41	**Message:** Bad release of pool	
Error	**Meaning**	**Suggested Response**
	Heap could not be released when deleting a controller.	Call the Honeywell Technical Assistance Center.
42	**Message:** No pool table	
Error	**Meaning**	**Suggested Response**
	Internal memory allocation problem.	Call the Honeywell Technical Assistance Center.
43	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**
44	**Message:** Bad move_parameter call	
Error	**Meaning**	**Suggested Response**
	There is a problem acquiring data from the interface point. The interface point is probably corrupt.	Rebuild the interface point.
45	**Message:** Could not get point info (DQP&end)	
Error	**Meaning**	**Suggested Response**
	Controller could not get information for control point.	Call the Honeywell Technical Assistance Center.
46	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**

Profit Optimizer Messages 47-52

47	**Message:** Extra field(s) in file	
Error	**Meaning**	**Suggested Response**
	More values than expected have been found for a record in a definition file.	Rebuild and reload the controller.
48-49	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**
50	**Message:** Please inactivate and reactivate point	
Error	**Meaning**	**Suggested Response**
	The controller does not recognize a new interface point, or does not recognize the gain/delay storage point. The point was rebuilt or added while the controller point was ACTIVE.	Set the controller point INACTIVE, then reactivate it.
51	**Message:** Bad or unreasonable value in CDS Connection App I :DITYPE(J)	
	Meaning	**Suggested Response**
	There is an unacceptable value in the CDS	Correct the value in the CDS
	Message: Bad or unreasonable value in CDS CMBD Cnstr I : CPAISFJ	
	There is an unacceptable value in the CDS	Correct the value in the CDS
	Message: Bad or unreasonable value in CDS Bdv I : X(J)	
	There is an unacceptable value in the CDS	Correct the value in the CDS
	Message: Bad or unreasonable value in CDS Interface App I: CDS Ver(J)	
	RMPCT/DQP interface CDS doesn't use the right version. J=1 : DMOD_CDS J=2 : DIN_CDS J=3 : DOUT_CDS J=4 : Any interface CDS	Use the correct version of the interface CDS
	Message: Bad or unreasonable value in CDS Interface App I: R VER(J)	
	Profit Controller (RMPCT) version is not correct	Use the correct version of Profit Controller
	Message: Bad or unreasonable value in CDS Interface App I: D VER(J)	
	Profit Optimizer (DQP) version is not correct.	Use the correct version of Profit Optimizer.
52	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**

Profit Optimizer Messages 53 - 56

53	**Message:** Call to X-side setup failed	
Error	**Meaning**	**Suggested Response**
	A failure occurred while attempting to communicate with the X-side from block DQP_PNTR on the main controller point.	1. Make sure that the AM is recognized as an AxM node. If not, reload the AxM (LCN-side). 2. Make sure that the gain/delay storage point is ACTIVE. 3. Make sure the XACCESS switch is set to READWRIT. This allows read-write capability to the LCN from all X-side applications. 4. Inactivate then reactivate the main controller point. 5. If the error persists, note the message number, and call the Honeywell Technical Assistance Center.
54	**Message:** Call to X-side read parameters failed	
Error	**Meaning**	**Suggested Response**
	A failure occurred while attempting to communicate with the X-side from block DQP_READ on the main controller point.	See the suggested response to error 53. But before calling TAC, make sure that: 1. The .XS and .XM files are located in /USERS/RMPC/CONFIG on the X-side. 2. They are readable by all. If not, enter this UNIX command: chmod 744/users/rmpc/config/* 3. The name of the .XS and .XM files on the Controller Detail display includes only the file names (no directories, and no extension).
55	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**
56	**Message:** Version mismatch; rebuild mdl/spec files	
Error	**Meaning**	**Suggested Response**
	Cannot read the controller definition files because they are not compatible with current LCN software.	Rebuild the controller using a compatible off-line builder, then reload the .XS and .XM files.

Profit Optimizer Messages 57 - 63

57	**Message:** Reserved	
Error	**Meaning**	**Suggested Response**
58	**Message:** X-side < - > LCN communication timeout	
Error	**Meaning**	**Suggested Response**
	The X-side did not respond to an LCN request in a reasonable time. Profit Optimizer predictions are reinitializing.	1. If this error does not clear, see the suggested response to error 53. 2. If the error persists, note the message number, and call the Honeywell Technical Assistance Center.
59-61	**Message:** Reserved	
	Meaning	**Suggested Response**
62	**Message:** No. of RMPCTs out of range	
Fatal Error	**Meaning**	**Suggested Response**
	Number of RMPCTs in the RM file is either less than 2 or greater than 40.	Check the off-line design, then rebuild and reload Profit Optimizer (DQP)
63	**Message:** An RMPCT point is missing or inactive	
Fatal Error	**Meaning**	**Suggested Response**
	All Profit Controller (RMPCT) points must be ACTIVE on DQP RESTART	Activate the Profit Controller (RMPCT) point.

Profit Optimizer Messages 64 - 68

64	**Message:** Interface point is missing or has error	
Fatal Errors	**Meaning**	**Suggested Response**
	Either Profit Controller (RMPCT)-side interface point missing, Profit Optimizer (DQP)-side interface point missing, Could not establish pointer to Profit Controller (RMPCT)-side interface point's CDS, Error moving DOUT_CDS for DQP interface points, or Call to X-side failed for AxM.	Check Profit Controller (RMPCT)/Profit Optimizer (DQP) interface point and CDSs, if it is calling to X-side failed, call the Honeywell Technical Assistance Center.
65	**Message:** Profit Controller (RMPCT)-Side Interface point error	
Fatal Errors	**Meaning**	**Suggested Response**
	Profit Controller (RMPCT)-side interface point missing/inactive, or the CDSs attached to the point is missing.	Make sure the interface point active. Check CDS Package on the point.
66	**Message:** Profit Controller (RMPCT)-side interface point tagname mismatch	
Fatal Errors	**Meaning**	**Suggested Response**
67	**Message:** Profit Optimizer (DQP)-side interface point error	
Fatal Errors	**Meaning**	**Suggested Response**
	Profit Optimizer (DQP)-side interface ppoint missing/inactive, or the CDSs attached to the point are missing.	Make sure the interface point is active. Check the CDS package on the point.
68	**Message:** Profit Optimizer (DQP)-side interface point tagname mismatch	
Fatal Errors	**Meaning**	**Suggested Response**

Profit Optimizer Messages
70 - 75

69	**Message:** Bridged DV interface point missing/inactive	
Fatal Errors	**Meaning**	**Suggested Response**
	Bridged DV interface point missing/inactive, or could not find BGD_CDS on bridge output point	Check Bridged DV point
70	**Message:** Error moving DIN_CDS or DMOD_CDS	
Fatal Errors	**Meaning**	**Suggested Response**
	DIN_CDS or DMOD_CDS on RMPCT/DQP interface point may have error	Check DIN_CDS and DMOD_CDS
71	**Message:** Profit Controller (RMPCT) has too few MVs or DVs for brg mdl	
Fatal Errors	**Meaning**	**Suggested Response**
	Not enough room for current bridge models and combined constrains.	Use the supported message to identify which RMPCT has error, go through off-line design then rebuild and reload Profit Optimizer (DQP)
72	**Message:** An RMPCT has too many BDVs	
Fatal Errors	**Meaning**	**Suggested Response**
	Too many bridged outputs in a single Profit Controller (RMPCT)	Reduce the number of bridged DVs in the off-line design, then rebuild and reload Profit Optimizer (DQP)
73	**Message:** # of RMPCTs/BDVs in file mismatches CDS	
Fatal Errors	**Meaning**	**Suggested Response**
	The number of RMPCTs or bridged outputs in the YM file doesn't match CDS	Check the off-line design and CDS
74	**Message:** Specification file doesn't match model	
Fatal Errors	**Meaning**	**Suggested Response**
	Number of bridged outputs in the YS file doesn't match the number in the YM file.	Check the bridged DVs off-line design.
75	**Message:** Some crit RMPCTs not ON, turning Profit Optimizer (DQP) off	
Fatal Error	**Meaning**	**Suggested Response**
	At least one critical Profit Controller (RMPCT) is not ON.	When all Profit Controllers(RMPCTs) are ON, Turn Profit Optimizer (DQP) back on.

Profit Optimizer Messages 76 - 82

76	**Message:** Turning DQP off	
Fatal Error	**Meaning**	**Suggested Response**
	The number of consecutive bad BDVs is greater than the max limit, or some RMPCTs are inactive.	When all RMPCTs are active and BDVs are ok, turn Profit Optimizer (DQP) back on.
77	**Message:** # of RMPCTs/BDVs in CDS mismatches model	
Fatal Error	**Meaning**	**Suggested Response**
	Number of RMPCTs or number of bridged ouputs in CDS mismatches the one in pool.	Check the off-line design and CDS.
78	**Message:** RMPCTs w/ BOuts must run as often as DQP	
Fatal Error	**Meaning**	**Suggested Response**
	The Control Execution interval of RMPCTs w/BOuts must be larger than DQP's control execution interval	Check the Control execution interval of Profit Controller (RMPCT) and Profit Optimizer (DQP)
79	**Message:** No. BOuts in Model file out of range	
Fatal Error	**Meaning**	**Suggested Response**
	Number of bridged outputs in YM file is either less than 0 or greater than 50	Check the off-line design
80	**Message:** No. BIns in Model file out of range	
Fatal Error	**Meaning**	**Suggested Response**
	Number of bridged inputs in RM file is either less than 0 or greater than 150.	Check the off-line design
81	**Message:** Inconsistent no. of BIns and BOuts in YM	
Fatal Error	**Meaning**	**Suggested Response**
	One of the numbers of BIns/BOuts is zero, the other on is not.	Check the off-line design
82	**Message:** Number of CCs in YM out of range	
Fatal Error	**Meaning**	**Suggested Response**
	Number of Combined Constraints in YM is either less than zero, or greater than 100	Check the off-line design

Profit Optimizer Messages 83-128

83	**Message:** Number of CC input/output inconsistent	
Fatal Error	**Meaning**	**Suggested Response**
	One of the number of the Number of CC input/output is zero, the other one is not.	Check the off-line design
84-85	**Message:** Reserved	
	Meaning	**Suggested Response**
86	**Message:** `Numerical problem detected in XM/YM file`	
Error	**Meaning**	**Suggested Response**
	A precision problem is detected in the model file.	Rebuild the model using Release 150.04 or higher. Note: Rebuilding the model may uncover errors. These errors must be corrected before a successful model can be created.
87-126	**Message:** Reserved	
	Meaning	**Suggested Response**
127	**Message:** No errors in optimizer (OPT)	
Information	**Meaning**	**Suggested Response**
	Optimization calculations are complete without error or constraint handling.	
128	**Message:** Constraint conflict (OPT)	
Information	**Meaning**	**Suggested Response**
	The control objectives of two or more CVs are competing for resolution. There are currently insufficient degrees of freedom to optimize.	

Profit Optimizer Messages
129 - 141

129	**Message:** Handling constraints II (OPT)	
Warning	**Meaning**	**Suggested Response**
	The control objectives of two or more CVs are competing for resolution. There are currently insufficient degrees of freedom to optimize.	Notify your supervisor or a Control Engineer.
130	**Message:** No MVs can be moved (OPT)	
Information	**Meaning**	**Suggested Response**
	Active upper and lower limits for **ALL** MVs are set equal. Profit Optimizer cannot make any moves.	This condition remains until intervened. On the MV Summary display, either (1) Increase the range on some of the MVs, or (2) Cascade some of the MVs.
131	**Message:** Too many iterations used (OPT)	
Warning	**Meaning**	**Suggested Response**
	The optimizer could not find a solution within a reasonable number of iterations.	If the problem persists, call the Honeywell Technical Assistance Center.
132 - 140	**Message:** Input data or memory problem (OPT)	
Error	**Meaning**	**Suggested Response**
	There is an AM memory or software error.	Try the following: 1. Rebuild and reload the controller. 2. Ensure that you are running the proper version of Profit Optimizer for your AM. 3. Reload the AM. If the error persists, note the message number, and call the Honeywell Technical Assistance Center.
141	**Message:** Limits are crossed (OPT)	
Error	**Meaning**	**Suggested Response**
	Soft high limit < low limit.	Either: • Relax the soft limits, or • Open the operating range.

Profit Optimizer Messages
142-180

142	**Message:** Requested MV move > MV ROC (OPT)	
Error	**Meaning**	**Suggested Response**
	MV value is outside its active limit by more than its rate of change limit.	Try the following: 1. Make sure that the proper compiled CL is being used (.AO files). 2. If you are using custom CL code to handle MV high and low limits, rewrite code to respect MV ROC. If the error persists, note the message number, and call the Honeywell Technical Assistance Center.
143 - 178	**Message:** Reserved	
	Meaning	**Suggested Response**
179	**Message:** Ignoring some coeffs; check soft bounds If both messages are triggered, number 1 has priority	
Information	**Meaning**	**Suggested Response**
1	Profit Optimizer connection is broken, check user-defined coeff	Set at least one of the quadratic coeff's of the user-defined connection to be greater than zero.
Information	**Meaning**	**Suggested Response**
2	Optimizer is ignoring one or more objective coefficients. This can happen when the active limits or the soft limits for a variable with a coefficient are equal. There is, consequently, no room to optimize the variable.	Re-evaluate the control and optimization objectives.

Profit Optimizer Messages 180-185

180	**Message:** Reserved	
	Meaning	**Suggested Response**
181	**Message:** Some Profit Controllers (RMPCTs) are inactive	
Warn	**Meaning**	**Suggested Response**
		Activate all Profit Controllers (RMPCTs)
182	**Message:** Some Critical Profit Controllers (RMPCTs)are not ON	
Warn	**Meaning**	**Suggested Response**
		All critical Profit Controllers (RMPCTs) should be ON if the Optimizer (DQP) is ON, they should be ON / WARM if the Optimizer is WARM
183	**Message:** Too many bad brdg inpts, prdctions reset	
Error	**Meaning**	**Suggested Response**
	The number of consecutive bad BDV inputs is greater than the max BVD Bad Re_init	
184	**Message:** Too many bad brdg inpts, turning DQP off	
Error	**Meaning**	**Suggested Response**
	The number of consecutive bad BDV inputs is greater than the max limit	When BDVs are ok, turn Profit Optimizer (DQP) back on.
185	**Message:** Too many bad crit brdg outputs, DQP off	
Error	**Meaning**	**Suggested Response**
	The number of consecutive bad BDV outputs is greater than the max limit	When BDVs are ok, turn Profit Optimizer (DQP) back on.

Profit Optimizer Messages 186-191

186	**Message:** Not able to read YM file with DQP ON for normal read	
	Meaning	**Suggested Response**
	Turn DQP off and then read YM file, or use the version with Read YM W/O INIT	
188	**Message:** DQP detected a configuration error	
Error	**Meaning**	**Suggested Response**
189*	**Message:** DQP read a bad ym file on the fly **OR** DQP read a bad ym file W/O INIT	
Warning	**Meaning**	**Suggested Response**
	Read YM file failed while optimizer is ON	Make sure the new YM file is consistent with the old one
190	**Message:** Read YM on the fly memory allocation err **OR** Read YM W/O INIT memory allocation err.	
Warning	**Meaning**	**Suggested Response**
	Read YM file failed while optimizer is ON	Make sure the AM has adequate memory
191	**Message:** Numerical problem detected in YM file while Read YM on the Fly OR Read YM W/OINIT	
Warning	**Meaning**	**Suggested Response**
	A precision problem detected in the model file caused Read YM failure while optimizer was ON.	Rebuild the model using Release 100.04 or higher. Note: Rebuilding the model may uncover errors. These errors must be corrected before a successful model can be created.

Appendix – Operator's Quick Reference

Overview

Engineers–Read This

This section is composed especially for Operators, but there is also information for you here, too. Make sure you are familiar with the procedure for inactivating a controller point, and for taking down an AM.

How Tasks Are Described

OPER Access This appendix concentrates on describing tasks usually performed by Operators (OPER access). Consequently, the information in this section is given in a vernacular suitable to that emphasis.

So, for example, to find information about a Tuning screen (which is more Engineer habitat than Operator) you find it under "*Displaying* the CV, MV Optimization Parameters," rather than, perhaps, "*Changing* the CV and MV Optimization Parameters."

Tasks described here include the procedure (appropriate to OPER access), comments about the procedure, and Notes.

ENG Access For convenience, tuning, optimization, and configuration help is included in the Comments column in the tables and in the Notes.

For Tuning Information

Engineers: For help with tuning, optimization, and configuration, see the publications listed in the References section.

About the Procedure Tables

Task descriptions include instructions (the steps) for displaying the Profit Optimizer screens and how to work them. This can include what target or sequence of targets to press, when to enter a value, and the different ways to do the work if more than one way is possible.

Additional help is given as notes following the procedures to introduce related information or to define terms.

Use available space on the page beneath the Notes to jot your own task-specific notes about working the displays.

Changing the MV Mode

Procedure

Table A-1 How to Change the MV Mode

Step	Action	Comments
1	Make sure that the controller you want displays in the current controller box on the Controller Bar.	Select controllers from the Profit Controller (RMPCT) main menu.
2	On the MV Detail display, touch [MODE].	[MODE] toggles control between RMPC and OPR. A blue border surrounds critical MVs. Critical MVs cannot have their mode changed.
3	Press <ENTER>.	

Notes

About MV modes:

Mode	Description
RMPC	MV is available for Profit Controller (RMPCT) control.
OPR	**Critical MVs** Critical MVs cannot be switched from CAS to MAN. When critical MVs go bad, the controller shuts down (OFF) and control sheds to the default regulatory mode. **Non Critical MVs** Non critical MVs can be dropped when they go bad, or used as feedforward variables. • DROP = MV is dropped from both the prediction and control calculations. • FFWD = MV is treated as a feedforward disturbance.

Changing CV, MV Operating Ranges

Procedure

Table A-2 How to Change the CV and MV Operating Ranges

<table>
<tr><th>Step</th><th>Action</th><th>Comments</th></tr>
<tr><td>1</td><td>Make sure that the controller you want displays in the current controller box on the Controller Bar.</td><td>Select controllers from the Application Menu</td></tr>
<tr><td>2</td><td colspan="2"><table><tr><th>If Changing</th><th>Then . . .</th></tr><tr><td>CV Range</td><td>Call CV Detail display.</td></tr><tr><td>MV Range</td><td>Call MV Detail display.</td></tr></table></td></tr>
<tr><td>3</td><td>Select either the low or high limit target.</td><td></td></tr>
<tr><td>4</td><td>Enter the new value.</td><td></td></tr>
<tr><td>5</td><td>Press <ENTER>.</td><td></td></tr>
<tr><td>6</td><td>Repeat Steps 3-5 if you are changing both ends of the operating range.</td><td></td></tr>
</table>

Notes

- DVs cannot be controlled, so they do not have operating ranges.
- Setting CV high and low limits equal establishes a setpoint for the variable.
- Setting **critical** MV high and low limits equal shuts down the controller.
- Setting **non critical** MV high and low limits makes the MV unavailable. Unavailable MVs are either dropped or used as feedforward values, depending upon the configuration (which is set on the MV Detail display).
- Profit Optimizer is fail safe, and will not let you transpose limits (will not let you enter a high limit lower than the low limit, or enter a low limit higher than the high limit).

Displaying the Process Graphic

Procedure

Table A-4 How to Display the Process Graphic

Step	Action	Comments
1	Make sure that the controller you want displays in the current controller box on the Controller Bar.	Select controllers from the Application Menu.
2	From any Profit Optimizer display, touch [RMPCT DISPLY] on the Menu Bar.	A list of all Profit Controllers used by this Profit Optimizer is shown.
3.	Select the description of an Profit Controller.	An Profit Controller (RMPCT) display is shown

Notes

Displaying the Optimizer Detail

Procedure

Table A-5 How to Display the Optimizer Detail

Step	Action	Comments
1	Make sure that the optimizer you want displays in the current Optimizer box on the Controller Bar.	Select optimizer from the Application menu.
2	From any Optimizer screen, touch the current controller box.	

Notes

Displaying CV and MV Tuning and Optimization Parameters

Procedure

Table A-6 How to Display CV and MV Tuning and Optimization Parameters

Step	Action	Comments
1	Make sure that the optimizer you want displays in the current optimizer box on the Controller Bar.	Select optimizer from the optimizer main menu. Select [APPLCN MENU] from any optimizer screen.

Notes

Some tuning parameters also display on the Detail displays.

Displaying and Acknowledging LCN Messages

Procedure

Table A-7 How to Display and Acknowledge LCN Messages

Step	Action	Comments
1	To view the Message Summary, on the console press <MSG SUMM>.	Button blinks red when there is a message.
2	After reading messages, press <ACK> to clear the red light.	
3	To clear the messages, press <MSG CLEAR>.	Press <MSG CLEAR> for each page. Messages remain in the Summary until cleared.

Notes

Displaying Profit Optimizer Messages

Procedure

Table A-8 How to Display Profit Messages

Step	Action	Comments
1	Make sure that the optimizer you want displays in the current optimizer box on the Optimizer Bar.	Select optimizer from the main menu.
2	From any optimizer display, touch [STATUS MSG] on the Menu Bar.	

Notes

Profit Optimizer messages include four levels of severity:

Table A-9 Profit Optimizer Message Levels

Level	Meaning
Information	Information only. No action required.
Warning	Conditions exist that are potentially harmful to the quality of control.
Error	Intervention required.
Clear	*Clear* displays after (1) Recovering from the conditions that prompted a warning, or (2) The error has been corrected.

Inactivating the Optimizer Point

Procedure

Table A-10 How to Inactivate the Optimizer Point

Step	Action	Comments
1	Make sure that the optimizer you want displays in the current optimizer box on the Optimizer Bar.	Select optimizer from the main menu.
3	From any optimizer display, touch [OFF] on the Optimizer Bar.	Optimizer sheds to the configured Profit Controllers (RMPCTs).
4	On the Optimizer Detail screen, touch the optimizer point name beside [TAG].	This displays the Point Detail pages.
5	Inactivate the point.	

Notes

- **Select OFF before Inactivating Point** Always shut OFF an optimizer from the Optimizer Bar before setting the optimizer point INACTIVE. Not doing so has consequences for the current optimizer, and can have consequences for other Profit Optimizers on the LCN.

Selecting an Optimizer

Procedure

Table A-12 How to Select a Profit Optimizer

Step	Action	Comments
1	From any Optimizer display, touch [APPLCN MENU] on the Menu Bar.	This displays the Profit Optimizer main menu, which shows all of the optimizers available on the system.
2	Select the name of the optimizer for the area you want.	
3	Press <ENTER>.	The optimizer name then displays in the current optimizer box. Any menu button that you now press displays information about this optimizer.

Notes

Shutting Down / Reloading / Restarting the AM

Procedure

Table A-13 How to Shut Down the AM

Step	Action	Comments
1	From the Optimizer Bar, turn off all the optimizers on the system.	Control sheds to configured Profit Controllers (RMPCTs).
2	Checkpoint the AM.	
3	Shut the AM down.	
4	Restart.	
5	Display the optimizer main menu.	
6	Select every optimizer you want on-line, and turn the optimizer ON from the Optimizer Bar.	If you want to watch an optimizer first before putting it in charge of your process, use WARM, watch the process, then turn ON.

Notes

ATTENTION

See "Inactivating the Optimizer Point" earlier in this section for important reasons why you always turn a Optimizer OFF before taking the optimizer point off the process.

Turning the Optimizer OFF

Procedure

Table A-14 How to Turn the Controller OFF

Step	Action	Comments
1	Make sure that the optimizer you want displays in the current optimizer box on the Optimizer Bar.	Select optimizer from the main menu.
2	From any Profit Optimizer display, touch [OFF] on the Optimizer Bar.	This takes Profit Optimizer off-line from the process. Even though control is off, however, Profit Optimizer continues to track the process and make predictions. There is no control output. Optimizer sheds to the configured Profit Controllers

Notes

- **OFF** When Profit Optimizer is off, it continues to track the process and execute its prediction calculations. It does not, however, execute its optimization calculations or output control moves.
- **INACTIVE** When the optimizer point is INACTIVE, it is entirely shut away from the process. Profit Optimizer is not updating its model matrix (is not following process changes), is not making optimizer or prediction calculations, and is not outputting control moves.
- **WARM** In WARM mode, Profit Optimizer continues to track the process and execute both the prediction and optimizer calculations, but there is no control output.

Turning the Optimizer ON

Procedure

Table A-15 How to Turn the optimizer ON

<table>
<tr><th>Step</th><th>Action</th><th>Comments</th></tr>
<tr><td>1</td><td>The following must be true:
• Profit Optimizer is installed correctly.
• Profit Optimizer points are built, linked, and active.</td><td>These tasks are the responsibility of the Control Engineer.</td></tr>
<tr><td>2</td><td colspan="2">
<table>
<tr><th>If</th><th>Then . . .</th><th>Comments</th></tr>
<tr><td>This Is a new optimizer</td><td>1. On the main menu, touch the optimizer name.
2. Press <ENTER>.
3. Select [ON] on the Optimizer Bar.</td><td>ATTENTION

On startup, it is best to first set the optimizer to WARM, watch its moves, then set the optimizer ON.

See Notes below.</td></tr>
<tr><td>This Is an Existing Optimizer</td><td>• If the optimizer is the current optimizer, touch ON.
• If the optimizer is not the current optimizer, return to the main menu, select the optimizer, then touch [ON] on the Optimizer Bar.</td><td></td></tr>
</table>
</td></tr>
</table>

Notes

- With the optimizer in WARM, it makes optimizer and prediction calculations without affecting the live process. For a new optimizer, use WARM mode.
- WARM provides the opportunity to watch the variables on the Optimizer Summary and Detail screens to see what the optimizer responses are to the process inputs. When switched ON, you then know that the optimizer is in sync with the process and the tuning is reasonable.
- WARM gives you the chance to troubleshoot the optimizer design and tuning if the start-up responses you notice are unreasonable or unsatisfactory.