IQAN Electronics

Simplicity now, not in the future

Catalog HY14-1825/US

⚠ WARNING

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

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Simplicity now, not in the future

The state-of-the-art IQAN system is a unique, totally electronic approach that replaces mechanical and electromechanical systems for controlling and monitoring hydraulics in mobile machines. With Parker's IQAN you have complete freedom to design customized software without advanced programming skills. The functions available within the IQAN system are so flexible that sophisticated applications are quickly programmed and optimized.

The wide range of outdoor modules with flexible I/O available with IQAN ensures complete machine management. The system offers a building-block approach that simplifies component design and installation and reduces development time and expense. IQAN hardware is tested for robust operation and compatibility with mobile hydraulic equipment. In addition, it meets industry and government standards for operation in severe conditions that include extremely high or low temperatures, vibrations, mechanical impact and electromagnetic interference.

IQANdesign and IQANdevelop offer system designers a complete set of tools for building competitive features and functionality into their hydraulic machine controls. IQANdesign and IQANdevelop are high-level graphical software tools that simplify application design and dramatically reduce development time by allowing the machine designer to program IQAN.

IQAN by Parker offers a complete range of control products to meet your needs. The TOC2 and analog joystick products are for basic valve driver applications. The TOC8 is a standalone controller with a flexible I/O setup and J1939 communication for a small machine system. The MDM, MDL and MC2 are CANbus master units. When combined with our versatile expansion modules, such as the XA2 and XT2, you can build a complete control system for a larger, more complicated machine.

IQAN is:

Mobility

Hardware designed and tested for mobile hydraulic equipment.

Simplicity

Implement complex machine functionality without any specialized programming knowledge.

Time to Market

Reduce development time using IQAN programming tools and standard hardware.

Machine management

Connection and communication capabilities for complete machine management.

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

Contents

When ordering IQAN Studios, the following items are included:

- IQAN Studio software CD-ROM
- 1 licence

The user's manual for IQANdesign is provided in electronic format and may be downloaded from our website, www.iqan.com. For a printed manual, contact Parker Catalog Services.

Communication cables are not included. Order the cables you need from the accessories section.

Requirements

CPU	PC compatible, Pentium® II 233 MHz or better
RAM	minimum 256 Mbyte (512 Mbyte recommended)
HD	100 Mbyte storage space available
Ports	serial port, RS232 or USB port
Display	XVGA (1280x1024 recommended)
Software	Windows® 2000, XP (Windows® XP is recommended)

Upgrade

It is always possible to download the latest version from our web site www.iqan.com.

Application

The IQAN software studios cover all phases of a machine's life cycle, from development through production to after sales. There are three different studios available; IQAN Creative Studio, IQAN Productive Studio and IQAN Active Studio.

IQAN Creative studio

IQAN Creative studio is a user-programmable software package for the R&D department. It includes tools for application development, simulation and initial setup.

- IQANdesign
- IQANsimulate
- IQANrun

IQAN Productive studio

IQAN Productive studio is a software package for the manufacturing and service departments. It includes development tools for customization and automation of production and maintenance processes.

- IQANscript
- IQANcustomize
- IQANsimulate
- IQANrun

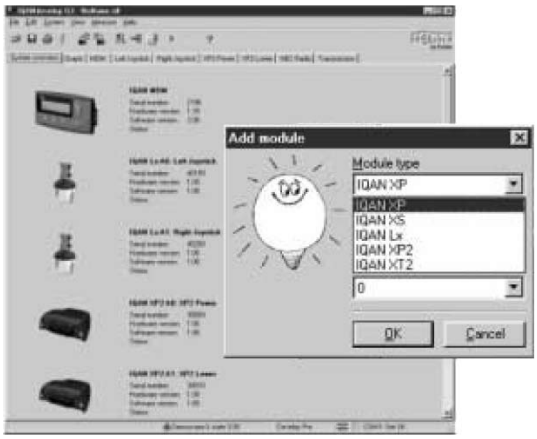
IQAN Active studio

IQAN Active studio is a software package for service and production personnel. It includes tools for machine diagnostics, setup and simulation.

- IQANrun
- IQANsimulate

IQAN Studios are used with the newest IQAN products including the IQAN-MD3 and IQAN-MDL master/display units and also with the IQAN-MC2 controller.

Description	Ordering PN
IQAN Creative Studio	20073643
IQAN Productive Studio	20073644
IQAN Active Studio	20073642



Contents

When ordering IQANdevelop, the following items are included:

- IQANdevelop software CD-ROM
- 1 licence
- 1 serial cable
- 1 simulation cable (PRO version only)

The user's manual for IQANdevelop is available in electronic format and may be downloaded from our website, www.iqan.com.

Requirements

CPU	PC compatible, Pentium® II 233 MHz or better
RAM	minimum 256 Mbyte (512 Mbyte recommended)
HD	100 Mbyte storage space available
Ports	serial port, RS232 or USB port
Display	XVGA (1280x1024 recommended)
Software	Windows® 2000, XP (Windows® XP is recommended)

Upgrade

It is always possible to download the latest version from our web site www.iqan.com.

Application

IQANdevelop is a software tool for adding modules and channels to the IQAN control system in order to build functions for the developer's mobile machine application.

The software is based on the different modules' block diagrams. To add a new module, you create a new block diagram. From the block diagram it is easy to set/edit channel parameters and measure the IQAN system.

With the navigator function in IQANdevelop you get an overview of the connected channels in a specific function. In this way it is easy to see how the channels interact with each other.

IQANdevelop is also a tool for measuring and troubleshooting IQAN systems. With a logging function, measurements can be viewed graphically. IQANdevelop PRO also includes IQANsimulate, for performing a virtual test of your application before installing it on the machine. IQANsimulate requires a National Instruments CAN communication card in order to operate.

IQANdevelop Change is a service tool which simplifies setup during production or after-sales service for your IQAN controlled mobile machine. Features that have been set as adjustable are easily accessed with the Change software by production employees and service personnel to fine tune and troubleshoot your machine's operation.

IQANdevelop software is used with the IQAN-MDM master/display and also with the IQAN-TOC8 and IQAN-TOC2 standalone controllers.

Description	**Ordering PN**
IQANdevelop PRO	20005607
IQANdevelop Change	20005606

General

Weight	0.3 Kg
Operating temperature	-30 to +60 °C -25>LCD off >+75 °C
Protection	outdoor use
Voltage supply	11- 32 Vdc
Current consumption (idle)	130 mA (28 Vdc) 190 mA (14 Vdc)

Performance

Processor	32-bit (144 MHz)
Logging	80K records
Sample time	min 10ms
Software tools	IQANdesign family

Communication interfaces

CAN (ISO 11898)	2
Protocols	ICP, SAE J1939, CANopen, etc
RS-232	1
Protocols	AT-Hayes,GSM07.07, GSM07.05, IDP
USB 2.0 (full speed)	1

Outputs

Digital output	1
Type	high side switch
Max load	200 mA

Inputs

Voltage inputs	7
Signal range	0 - 5 Vdc
Resolution	1.2 mV
Digital inputs	(7)[1]
Signal high	4 Vdc
Signal low	1 Vdc

1) The voltage and digital inputs share the same physical pins. The user defines the channels/pins with IQANdesign.

Application

The IQAN-MD3 is a master unit that works with a variety of expansion modules in the IQANdesign platform control system. The MD3 is fully programmable for use in any machine application, as a graphical user interface and as a CAN gateway.

The IQAN-MD3 is constructed to be weatherproof for outdoor use. The MD3 will display vehicle data and system information.

The IQAN-MD3 has a 3.5" transflective TFT color display. There are five navigation buttons and four 'soft' function buttons to make interaction with the control simple for the operator.

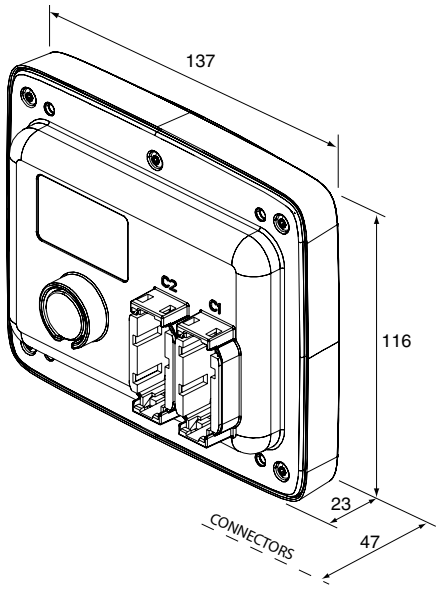
The unit is designed to be easily mounted in a vehicle dashboard or exterior control panel. The unit has two sealed and keyed Deutsch DTM 12 position connectors.

For time critical functions the MD3's sample rate can be set as low as 10 ms. The unit has a large internal memory for events and logging that is capable of storing 80,000 records.

The MD3 analog inputs accept 0-5V signals from input devices or sensors. These inputs can also be set up as on-off inputs. A digital output is available and may be used for alarm or alert signals.

The MD3 is connected to other units by two CAN busses. All CAN busses may be configured as ICP (IQAN CAN Protocol), SAE J1939 or Generic CAN. The unit supports RS232 for modem (remote diagnostic) connection and USB for communication with a PC.

Description	**Ordering PN**
IQAN-MD3	20072409



units=mm

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	in-cab use
Voltage supply	11 - 32 VDC
Current consumption (idle)	180 mA (28 VDC) 170 mA (14 VDC)
Data interface	
Type	Parker ICP (IQAN CAN Protocol) J1939, generic, etc.
Communication ports	
Type	RS232, USB
Modem	
Type	GSM triband (900/1800/1900 MHz)

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	50 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Quadrature inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Digital inputs	
DIN-A thru -D, DIN-M thru -P	
Signal high	>2 VDC
Signal low	<0.8 VDC
DIN-E thru -L	
Signal high	>3 VDC
Signal low	<2.5 VDC

Application

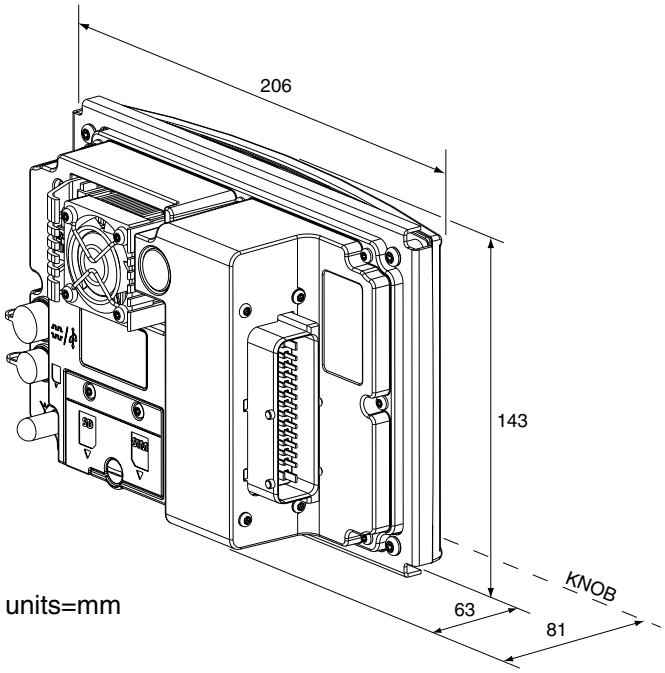
The IQAN-MDL is a central unit that works with a variety of expansion modules in an IQAN control system. The MDL works as a master, displays information, provides a data gateway and has a variety of flexible I/O channels.

The IQAN-MDL is intended for the in-cab environment and will display vehicle data and system information. In most applications the display will replace all mechanical dial type instruments. The MDL has a 6.5" transflective TFT color display that has very high optical performance across a wide range of operating conditions.

The MDL can control proportional valves using current mode (current closed-loop) or PWM mode (voltage open-loop) signals. The analog inputs accept 0-5V signals from input devices or sensors. These inputs can also be set up to accept one frequency or directional frequency (quadrature) input. Many outputs may alternatively be used as digital inputs for switches. The unit also has 4 CAN interfaces, all of which are user configurable. The MDL is connected to other units by a CAN bus. The unit has two RS232 ports for communication, a USB port and an embedded GSM triband modem.

The back of the unit has an SD memory slot for convenient data logging, a SIM card slot and an SMA antenna connection for the modem. The MDL is ready for advanced telematic functions.

Description	**Ordering PN**
IQAN-MDL	20016753



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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Temperature range	-40 to +70 °C
Protection	outdoor use
Voltage supply	11- 32 VDC
Current consumption (idle)	160 mA (28 VDC) 200 mA (14 VDC)
Data interface	
Type	Parker ICP (IQAN CAN Protocol) J1939, Generic CAN
Communication port	
Type	USB 1.1

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2000 mA

Inputs

Voltage inputs	
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 20000 Hz
(position mode)	0 - 20000 Hz
Digital inputs	
Signal high	4 VDC - V_{BAT}
Signal low	0 - 1 VDC

Application

The IQAN-MC2 is a flexible master unit for the IQAN bus system. This unit is suitable for use as either a Bus master or standalone control. The IQAN-MC2 has new I/O flexibility that allows the user greater freedom in defining signals for both measurement and control.

The different input types are voltage, on/off, pulse and frequency. The outputs are proportional and on/off. The unit also has two CAN interfaces for bus communication using IQAN CAN Protocol (ICP) and SAE J1939 or Generic CAN.

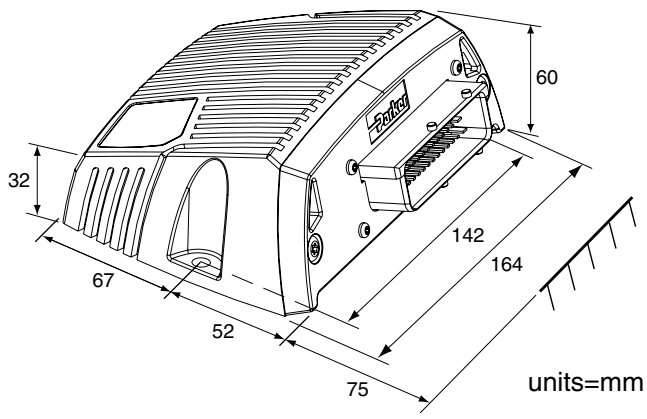
The MC2 is equipped with a Real Time Clock and can perform data logging functions.

The IQAN-MC2 can control proportional valves using current mode (current closed-loop) or PWM mode (voltage open-loop) signals. The analog inputs will accept 0-5V signals from input devices or sensors. The inputs can also be configured for 5 frequency inputs. Some outputs may alternatively be used as voltage inputs or digital inputs for switches. For communication and diagnostics the MC2 has a USB interface.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The IQAN-MC2 has a membrane to prevent condensation inside the housing. Additional protection allows the unit to be steam-cleaned. This controller is designed for the outdoor environment.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-MC2	20070899



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General

Weight	0,2 kg
Operating temperature	-30 to +70 °C
(reduced display update)	(-30 to 0 °C)
Protection	outdoor use
Voltage supply	11 - 32 VDC
Current consumption	max 0,1 A (28 VDC), max 0,18 A (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Display

Type	LED back-lit LCD
Resolution	202x32 pixels

Digital output

Number	1 pcs
Type	high side switch
Output	max 1,2 Adc

Serial communication

Interface	RS232 ”handshake”
Bit rate	57,6 Kbit/s
Protocol	PARKER IDP

Application

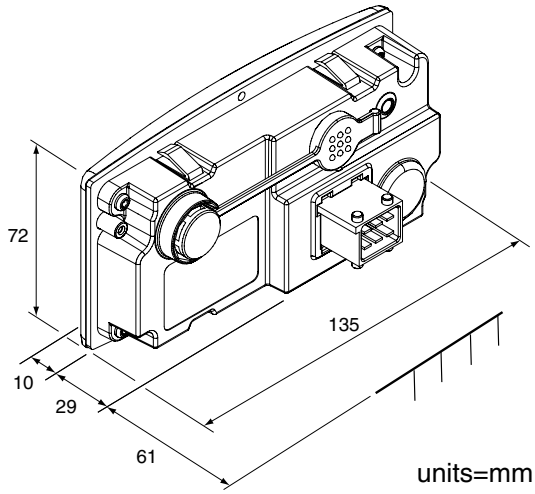
The IQAN-MDM works as the central unit, together with expansion modules in an IQAN control system. The MDM works both as a master and a display unit. It is possible to download a sample application from our website for crane control. This application can easily be modified, by means of IQANdevelop software, to include functions such as; overload protection, end position damping, envelope control etc.

With the three function buttons, a decrease/increase value-button and an escape-button, it is easy to adjust, calibrate and measure the IQAN system. In case of an error the display will alert the operator with a signal and a message on the display.

The MDM has a back-lit graphic LCD. The display also contains a real time clock, an alarm output and can present text in 10 different languages.

IQAN-MDM is designed for in-cab as well as outdoor use. IQAN-MDM is connected to other modules via a CAN bus which makes data exchange more efficient, simplifies installation and increases noise immunity. The unit has an RS232 port for communication with a PC.

Description	Ordering PN
IQAN-MDM	5010010



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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	11- 32 VDC
Current consumption (idle)	180 mA (28 VDC) 170 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Quadrature inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Digital inputs	
Signal high	4 VDC - V_{BAT}
Signal low	0 - 1 VDC

Application

The IQAN-XA2 is the next generation of expansion module in the IQAN product group. This unit is designed for high digital I/O count, weather resistance, and safety.

All IQAN expansion modules communicate with a master over a CAN bus. The XA2 module has new I/O flexibility that allows the user greater freedom in defining signals for measurement and control.

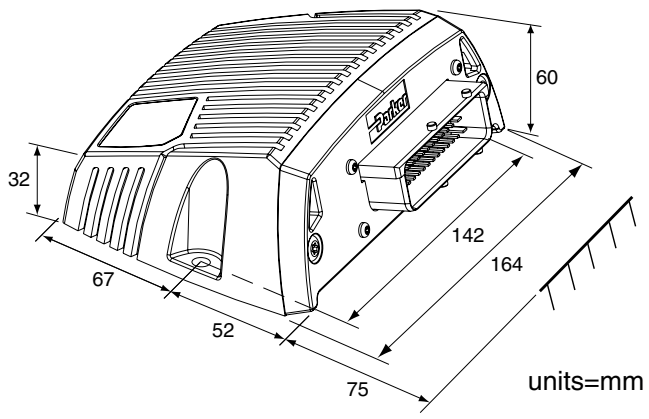
The IQAN-XA2 can control proportional valves using current mode (current closed-loop) or PWM mode (voltage open-loop) signals. The analog inputs accept 0-5V signals from input devices or sensors. These inputs can also be set up to accept 4 frequency or 2 directional frequency (quadrature) inputs. Many outputs may alternatively be used as digital inputs for switches. The XA2 also has a number of high power digital (on-off) outputs.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The XA2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XA2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-XA2	5010033



Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	11- 32 VDC
Current consumption (idle)	180 mA (28 VDC) 170 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 VDC
Resolution	5 mV
Digital inputs	
Signal high	4 VDC - V_{BAT}
Signal low	0 - 1 VDC

Application

The IQAN-XS2 is the next generation of expansion module in the IQAN product group. This unit is designed for high digital I/O count, weather resistance, and safety.

All IQAN expansion modules communicate with a master over a CAN bus. The XS2 module has a large number of inputs and outputs that allows the user to have fewer modules for digital signals.

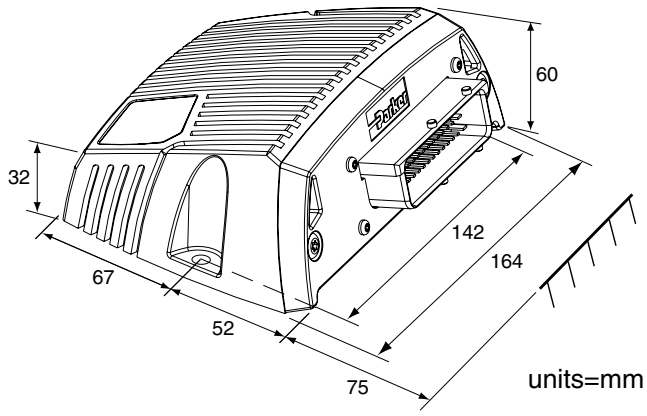
The IQAN-XS2 can control valves using digital (on-off) output signals. The analog inputs accept 0-5V signals from input devices or sensors. These analog inputs may alternatively be used as high impedance digital inputs for switches. The XS2 also has a number of dedicated digital (on-off) inputs.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The XS2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XS2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-XS2	5010017



Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply 9 - 34 VDC	
Current consumption (idle)	180 mA (28 VDC) 170 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)
Additional CAN hub	J1939 or other byte aligned CAN protocol

Outputs

Proportional current outputs	
Number	2 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA
Digital/ PWM (no current feedback)	
Number	6 / 3 double
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz
E-gas/Servo motor output (PWM H-bridge)	
Number	1
Signal Range	0-100% rated power
Max load	2,5A

Inputs

Voltage/Frequency	
Number	10/3
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency range	1-10 000 Hz

Application

IQAN-XT2 is one of the “rugged generation” of IQAN expansion modules. Key improvements for this generation of modules are flexibility, weather resistance and safety.

All IQAN expansion modules communicate with a master over a CAN-BUS serial link. The XT2 has an additional CAN hub designed to interface with J1939 diesel engines on mobile machinery and has a dedicated output for electronic throttle control.

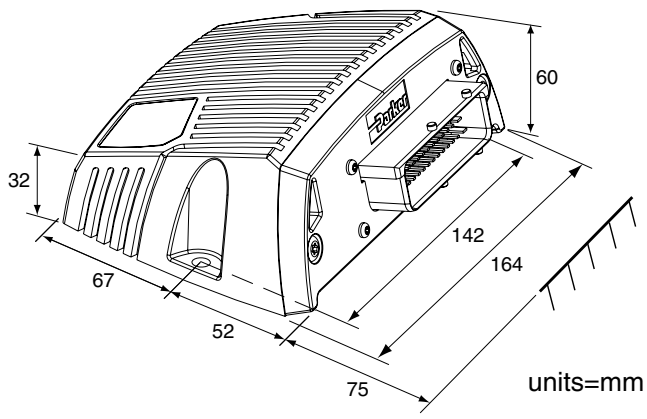
The XT2 module has a flexible I/O interface which gives system designers increased options. The same physical pin can be used for different types of inputs or outputs. New types of I/O such as E-gas and PWM outputs increase the flexibility of the module. Digital outputs now have features such as softstart and peak & hold. The J1939 CAN hub allows the XT2 to communicate directly with an electronic engine control bus.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The XT2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XT2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-XT2	5010018



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General

Weight	LM 0,4 Kg, LL 0,9 Kg
Rated power supply	12 – 24 VDC
Min/max power	9 / 32 VDC
Operating temperature	-30 to +70 °C
Protection	in-cab use
Current consumption	57 mA (28 VDC),
(idle)	46 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Axis sensors

Number	max 3 pcs, inductive
Resolution	9 bit

Neutral position detection

Signal	IR-sensor, on/off

Digital inputs

Number	10 pcs, 4 internal, 6 external (differs according to handle)
Signal range	0 – 5 VDC 0 – 32 VDC
Active range	”0” = 0,0 – 1,0 VDC, ”1” = 2,0 – 32,0 VDC

Analog inputs

Number	2 pcs
Signal range	0 – 5 VDC 0 – 32 VDC
Active range	0,5 – 4,5 VDC
Resolution	5 mV

Digital outputs

Number (takes place of 1 digital input)	1 pc
Signal	200 mA

Application

IQAN-LM is especially suitable for continuous duty machine operations such as in forestry and construction work. The combination of a mini-lever and armrest provide substantial ergonomic benefits.

IQAN-LL is designed for rough handling. The ergonomic design gives good support to the arms and wrists and assures a comfortable grip from several angles. The design allows operators to quickly become familiar with the lever.

Both levers are designed for in-cab use, one type for connection to both 12 VDC and 24 VDC systems. All inputs and outputs are protected against short circuit to ground and to main power supply.

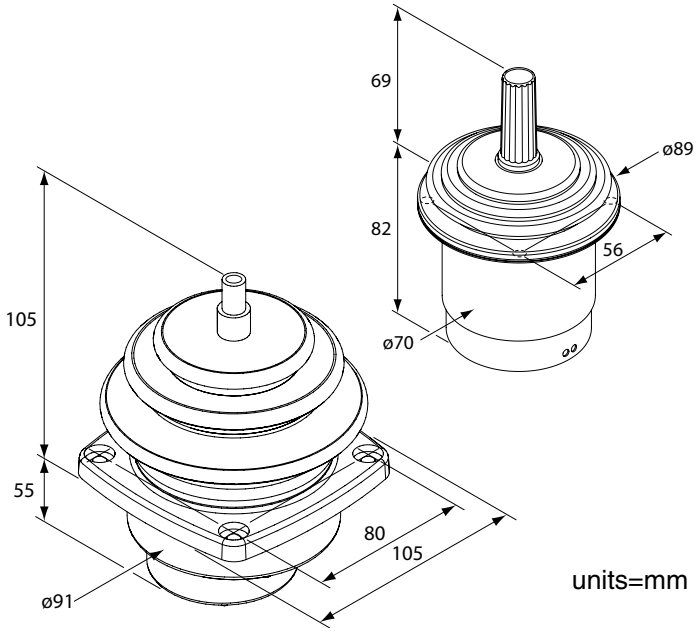
The IQAN levers are connected to other modules through a CAN bus which makes data exchange more efficient, simplifies installation and increases noise immunity. The lever units are lightweight with small installation dimensions and have low, well-adapted actuating forces.

All proportional inputs are of contactless inductive type with neutral position sensors to provide high safety and reliability. A LED indicator shows supply voltage and internal operation.

A number of different handle types are available.

Description	Ordering PN
IQAN-LL-2U (no handle)	20005961
IQAN-LM-2A (stick handle)	20005963

Consult datasheet and pricelist for other handle options and ordering part numbers.



units=mm

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	9 - 34 VDC
Current consumption (idle)	105 mA (28 VDC) 90 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Proportional current outputs	
Number	4 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA
Digital/ PWM (no current feedback)	
Number	4/ 2 double
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz

Inputs

Voltage/Frequency	
Number	4/2
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency range	1-30000 Hz

Application

IQAN-XP2 is the first of the “rugged generation” of IQAN expansion modules. Key improvements for this generation of modules are flexibility, weather resistance and safety.

All IQAN expansion modules communicate with a master over a CAN-BUS serial link. Mobile machine I/O is controlled by selecting the appropriate expansion module from the IQAN product family.

The XP2 module has a flexible I/O interface which gives system designers increased options. The same physical pin can be used for different types of I/O.

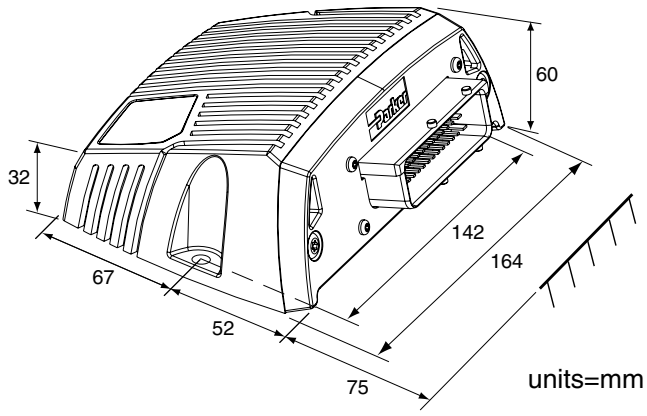
New types of I/O such as PWM outputs increase the flexibility of the module. Digital outputs now have new features including softstart and peak & hold.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The XP2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XP2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-XP2	5010016



Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply 9 - 34 VDC	
Current consumption (idle)	180 mA (28 VDC) 170 mA (14 VDC)
Data interface	RS232 (using IQANdevelop)
CAN hub	J1939 or other byte aligned CAN protocol

Outputs

Proportional current outputs	
Number	2 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA
Digital/ PWM (no current feedback)	
Number	6 / 3 double
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz

Inputs

Voltage/Frequency	
Number	10/4
Signal range	0 - 5 VDC
Resolution	5 mV
Frequency range	2-10 000 Hz

Application

IQAN-TOC8 is from the same family as the ”rugged” generation of expansion modules in the IQAN product group. These modules focus on flexibility, weather resistance and safety.

IQAN-TOC8 is a general purpose controller and communicates with a variety of input and output devices. It connects to a laptop PC and is programmed with IQANdevelop software. No Master module is required. It has proportional current outputs for valve control, digital/PWM outputs for auxiliary functions and analog/digital inputs for signals like pressure, RPM or temperature. The unit has a CAN hub designed to interface with a SAE J1939 network.

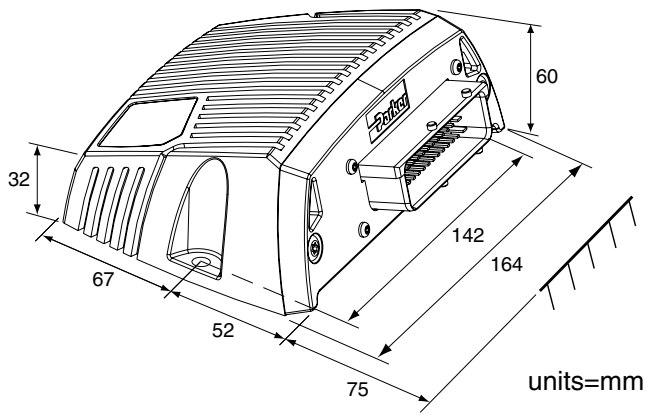
The IQAN-TOC8 has a flexible I/O interface. The same physical pin can be used for different types of I/O. New types of I/O such as digital PWM outputs increase the flexibility of the controller. The digital outputs have new features such as softstart and peak & hold.

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The TOC8 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-TOC8 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-TOC8	5010024



Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	0.2 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	9 - 34 VDC
Current consumption (idle)	60 mA (28 VDC) 40 mA (14 VDC)
Data interface	mechanical encoder or RS232 (using IQANdevelop)
VREF output	4.9 - 5.1 VDC 30 mA (28 VDC)

Outputs

Current / PWM outputs	
Number	2 double
Type current mode	current - closed loop
PWM mode	voltage - open loop
Min. threshold	50 mA
Max. load	3000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA

Inputs

Voltage inputs	
Number	2
Signal range	0 - 5 VDC
Resolution	5 mV
Digital inputs	
Number	2
Signal high	4 VDC - V_{BAT}
Signal low	0 - 1 VDC

Application

The IQAN-TOC2 is a simple task oriented controller in the IQAN product group. This unit is designed for ease of setup, weather resistance, and safety.

The TOC2 is a general purpose unit that can control two bi-directional valve sections or two cartridge solenoids simultaneously. The IQAN-TOC2 communicates with a variety of input and output devices. It has current mode (current closed-loop) or PWM mode (voltage open-loop) output for valve control. The analog inputs accept signals from joysticks or potentiometers. Two digital inputs can be used to read switches.

The IQAN-TOC2 has a simple mechanical interface for calibration. With a preloaded personality from the factory, setup can be easily performed on the machine using a screwdriver. Adjustments possible include threshold, maximum output and slopes. The TOC2 may also be connected to a PC or Palm device and programmed using IQANdevelop software to change the functionality of the controller. This advanced feature allows the TOC2 to be used in more demanding applications.

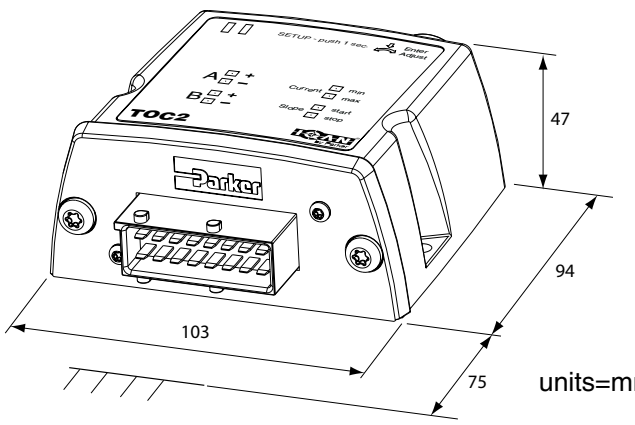
The housing is designed to be rugged, but light and has a sealed, automotive AMP junior-power timer connector. The IQAN-TOC2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

The TOC2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

Description	**Ordering PN**
IQAN-TOC2 (100 hz)	5010028

Consult pricelist for other TOC2 factory preloaded personalities and their ordering part numbers.



General

Weight (LSL)	0.22 Kg
Weight (LST)	0.04 Kg
Rated power supply (V_S)	5 VDC
Load resistive (min.)	1K ohm
Load capacitive (max.)	1 µF
Current consumption	16 mA

Mechanical

Angle of movement (LSL)	±20°
Angle of movement (LST)	±30°
Expected life (operations)	5 million

Environment

Operating temperature	-40 to +70 °C
Sealing above flange	IP65
Sealing with DN option	IP44
Sealing (LST)	IP66

Analog outputs

Active range (VDC out)	10%-90% V_S
Resolution	<2mV

LSL Options

Handle switch, top E1	V_{BAT} (+12V, +24V)
Mechanical detent DN	Neutral only
Solenoid detents	V_{BAT} (+24V)
Type L1	B(-)
Type L2	A(+) and B(-)
Type L3	75% B(-)

Application

The IQAN-LSL is a linear lever and the IQAN-LST is a linear, paddle style, mini-lever in the IQAN product group. These levers focus on compact design, weather resistance and safety.

Both levers are single-axis joysticks, 0.5 - 4.5 VDC, intended for the proportional control of one double-acting hydraulic function. The LSL has several options including a manual neutral detent, a switch in the top of the handle and solenoid detents at full stroke in either the B (minus) direction or both A (plus) and B (minus) directions. A solenoid detent at 75% in the B (minus) direction is also available. The LSL and LST can be mounted in the armrest or on the dashboard in mobile vehicles. they have comfortable grips and are easily actuated for good ergonomics.

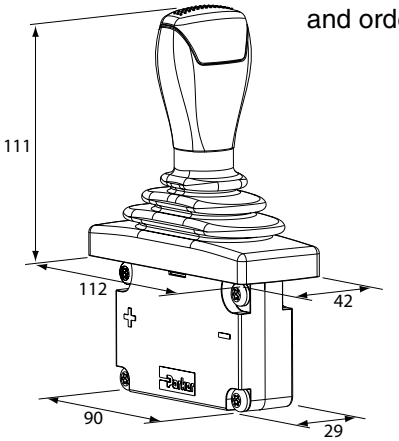
The IQAN-LSL and LST are lightweight with small installation dimensions. The levers are covered with friction rubber on either side, to prevent the fingers from slipping and to provide a comfortable feel. Mounting screws are installed from underneath for a clean appearance of dashboard, panel or armrest.

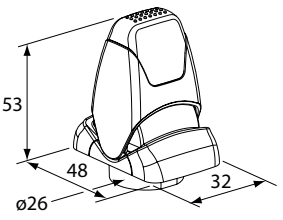
The IQAN-LSL has an IP65 rating above the flange and the IQAN-LST with potted electronics, has an IP66 rating. The cables for the levers have a sealed, automotive type AMP junior-power timer connector. Both units are designed for the outdoor environment.

The IQAN-LSL and LST are spring centered, dual sensor devices. The dual sensors provide 0.5 - 4.5 VDC and 4.5 - 0.5 VDC outputs which allows error checking to meet high safety requirements. The optional switch in the top of the LSL handle can be used to detect operator presence. All inputs and outputs are protected against short circuit to ground.

Description	Ordering PN
IQAN-LSL-E0-//-//	20011365
IQAN-LST	20011381

Consult datasheet and pricelist for other LSL options and ordering part numbers.





units=mm

General

Weight	0.060 kg
Connector	AMP JPT (-S) Deutsch DT (-D)
Pressure connection	DIN G1/4" (-S) SAE 6, 9/16"-18 (-D)
Operating temperature	-40 to +125°C
Enclosure	IP65

Performance

Pressure range	0 - 35 bar, 0 - 500 bar
Total error (-40°C to 105°C)[1)]	Max 4.0 % FS
Total error (40°C to 80°C)[1)]	Max 1.0 % FS
Response time[2)]	5.0 msec
Over pressure SP035	Max 100 bar
Over pressure SP500	Max 1050 bar
Burst pressure SP035	Min 150 bar
Burst pressure SP500	Min 1500 bar

1) Total accuracy includes non- linearity, hysteresis, repeatability and temperature effects.
2) Measured from initial value to output at 90%.

Electrical specifications

Output at FS[3)]	4.5 VDC
Zero output[3)]	0.5 VDC
Supply Voltage(Vs)	5.0 ±10% VDC[4)]
Current supply	Max 12.5 mA
Load resistor	Min 5k ohm
Load capacitor	Max 0.1 µF

3) The output is ratiometric to supply voltage (Vs)
4) The max supply voltage with sensor operating is 6 Volt. (switch off app. 6.2 Volt)

Application

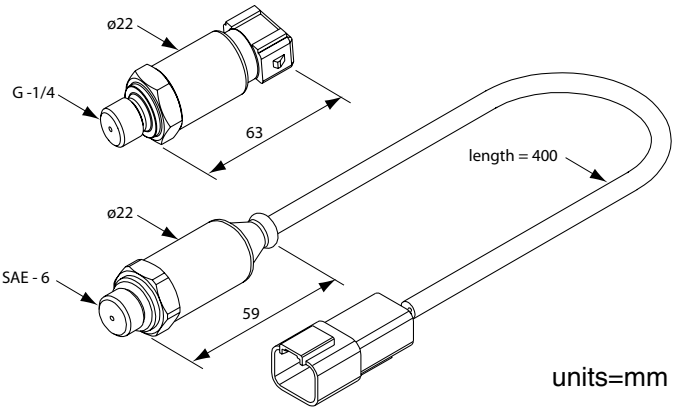
The IQAN-SP pressure transducers belong to the family of IQAN accessories developed to complement IQAN control systems. IQAN-SP is a range of 0-5V pressure transducers for mobile hydraulic applications. These transducers are available in two pressure ranges; 35 bar (500 psi) and 500 bar (7300 psi).

The IQAN-SP has stainless steel construction for strength. The sensor cells use thin film technology with no internal o-rings or fluid. The sensors are very robust and able to withstand heavy vibrations.

The design of the IQAN-SP has an EMI cap that separates the sensor electronics from the connector to ensure a high level of EMI protection.

The two interface types of the IQAN-SP are well designed for the mobile hydraulics industry. The first type, -S, has a G1/4 thread. The hex of the transducer has an integrated face seal to eliminate sealing washers. The integral 3 pin connector is a sealed AMP Junior Power Timer type designed for automotive use. The second type, -D, has a SAE 6 (9/16"-18) thread. The connector on this type is a 4 pin Deutsch DT style and is attached via a short cable. Both connector types give the sensors IP65 protection for exposed outdoor applications.

Description	Ordering PN
IQAN-SP035-S	5020026
IQAN-SP500-S	5020027
IQAN-SP035-D	2820008
IQAN-SP500-D	2820009



units=mm

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

General

Weight	50 g
Operating temperature	-50 to 150°C
Protection	outdoor use
Pressure rating	
G (1/4 BSP)	Max 700 bar
M (M10)	Max 350 bar
U (SAE 6)	Max 1000 bar
Electrical	
Voltage supply VS Max 6 Vdc	5±0.5 Vdc
Current consumption	5.0 µA Max 7.5 µA
Total error (25°C)	1%
Total error (-40 to 150°C)	4%

Output

FS (150°C)	4.75 Vdc
Zero (-50°C)	0.25 Vdc
Span	4.50 Vdc
Ratiometricity	1%
Linearity	1% FS

Threaded interfaces

G	1/4”-19 BSP with integral face seal
M	M10 x 1, with integral face seal
U	9/16”-18 UNF, SAE 6 with nitrile o-ring seal

Connectors

B	Bosch (AMP Junior Timer)
D	Deutsch DT04-4P

Application

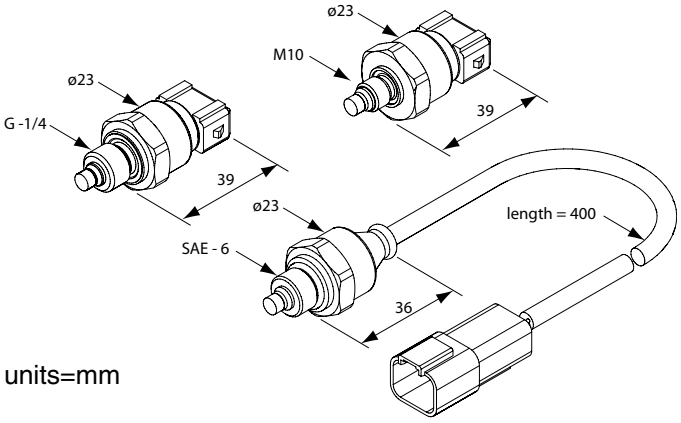
The IQAN-ST temperature transducer belongs to the family of IQAN accessories developed to complement IQAN control systems. IQAN-ST is a 0-5V output temperature transducer for mobile hydraulic applications. This transducer is available in three interface types; G1/4 BSP, M10 and 9/16”-18 UNF SAE 6. The G1/4 BSP and M10 sensors have an integral Bosch automotive connector. The SAE 6 sensor has a short cable-mounted Deutsch connector.

The IQAN-ST has stainless steel construction for strength. The PT100 sensor uses thin film technology with internal amplification. All versions of the sensor have high pressure capability. The IQAN-ST is very robust and able to withstand heavy vibrations.

The design of the IQAN-ST has an EMI cap that separates the sensor electronics from the connector. This ensures a high level of EMI protection.

The IQAN-ST is well designed for the mobile hydraulics industry. The 3 pin integral Bosch connector is a sealed AMP Junior Timer type. The Deutsch connector is the DT04 type. Both connectors are designed for automotive use. These connectors give the sensor IP65 protection for exposed outdoor applications. The hex of the G1/4 BSP and M10 versions of the transducer have integrated face seals to eliminate loose sealing washers. The SAE 6 sensor type has a factory installed 0-ring. These features provide for easy installation and removal, even in field conditions.

Description	Ordering PN
IQAN-ST-G-B	20073657
IQAN-ST-M-B	20073659
IQAN-ST-U-D	20073658



units=mm

Tools

5031061
Medium duty service kit
contents: 3 crimping tools
1 5031057 pin box
1 5035003 extractor set
crimping tools not sold separately

5031057
Pin box, JPT and MT parts
contents:

qty	AMP/Tyco PN
100	962945-2
100	963531-1
100	963530-1
100	963711-2
50	927779-1
25	927777-1
25	828922-1
25	929938-1
50	929940-1
25	2-963745-1
50	828904-1
25	828905-1

AMP parts not sold separately

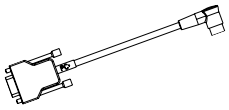
5035003
Set of 3 extraction tools, stamped
contents: 1 JPT extractor (yellow)
1 MT extractor (blue)
1 pin extractor (red)

12000199
Extraction tool, hardened alloy
contents: 1 MT extractor (blue)

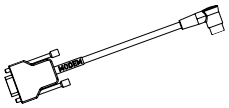
12003099
Extraction tool, hardened alloy
contents: 1 JPT extractor (yellow)

Communication cables

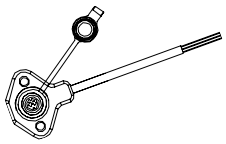
5030024
RS232-cable
length: 1,5 meters
use with: IQAN-MDM, -TOC8, -TOC2 (TOC's require adapter)



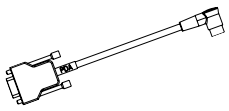
5030080
Remote diagnostics-cable
length: 1,5 meters
use with: IQAN-MDM, -TOC8, -TOC2 (TOC's require adapter)



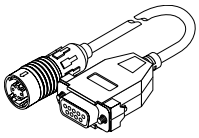
5030089
Adapter-cable, panel mount
length: 0,4 meters
use with: IQAN-TOC8, -TOC2



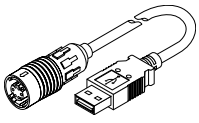
5030096
Palm PDA-cable (for T, T2, T3)
length: 1,5 meters
use with: IQAN-MDM, -TOC8, -TOC2 (TOC's require adapter)



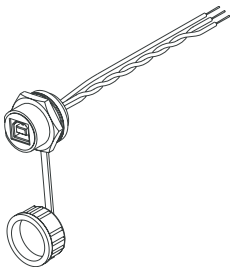
5030103
RS232-cable
length: 1,5 meters
use with: IQAN-MDL



5030110
USB-cable
length: 1,5 meters
use with: IQAN-MDL



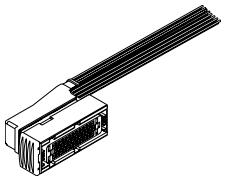
5030124
USB adapter-cable, panel mount
length: 0,4 meters
use with: IQAN-MC2, -MD3



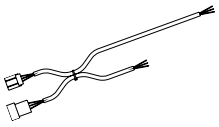
Consult "IQAN accessories" datasheet and pricelist for other accessory items and ordering part numbers.

Prototype installation cables

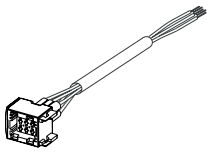
5030025
C1-cable, no seals
length: 2,5 meters
use with: IQAN-MDL



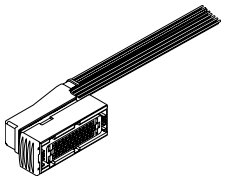
5030027
CAN/PWR/IO-cable, no seals
length: 2,5 meters
use with: IQAN-LL, -LM



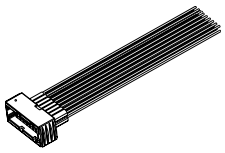
5030029
C1-cable, with seals
length: 2,5 meters
use with: IQAN-MDM



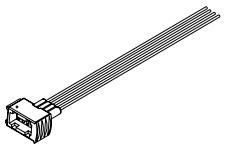
5030030
C1-cable, with seals
length: 2,5 meters
use with: IQAN-XA2, -XS2, -XT2, -XP2, -TOC8, -MC2



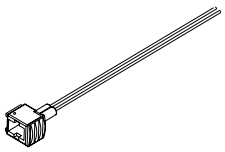
5030090
C1-cable, with seals
length: 2,5 meters
use with: IQAN-TOC2



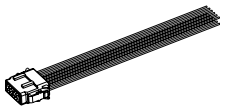
5030094
C1-cable, with seals
length: 2,5 meters
use with: IQAN-LST, -LSL



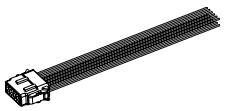
5030095
C2-cable, with seals
length: 2,5 meters
use with: IQAN-LSL options



5030125
C1-cable, sealed
length: 2,5 meters
use with: IQAN-MD3

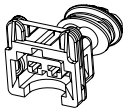


5030126
C2-cable, sealed
length: 2,5 meters
use with: IQAN-MD3

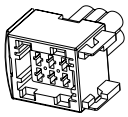


Connector kits

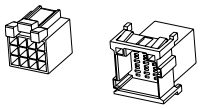
5031007
C1-connector, 2 position
use with: Temperature sensor



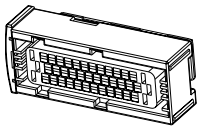
5031022
C1-connector, 6 position
use with: IQAN-MDM



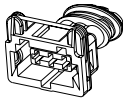
5031048
C1 and C2 -connectors, 12 pos.
use with: IQAN-LL, -LM



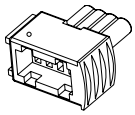
5031063
C1-connector, 42 position
use with: IQAN-XA2, -XS2, -XT2, -XP2, -TOC8, -MDL, -MC2



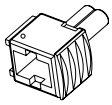
5031086
C1-connector, 3 position
use with: IQAN-SPxxx-S



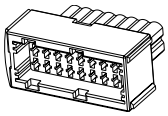
5031097
C1-connector, 4 position
use with: IQAN-LST, -LSL



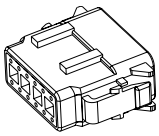
5031098
C2-connector, 2 position
use with: IQAN-LSL options



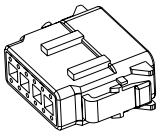
5031105
C1-connector, 16 position
use with: IQAN-TOC2



20072406
C1-connector, 12 position
use with: IQAN-MD3



20072407
C2-connector, 12 position
use with: IQAN-MD3



Consult "IQAN accessories" datasheet and pricelist for other accessory items and ordering part numbers.

IQAN compatibility matrix

Software and CAN modules	CAN system Masters				Standalone units	
	 MDL	 MD3	 MDM	 MC2	 TOC8	 TOC2
 **IQAN design**	✔	✔		✔		
 **IQAN develop**					✔	✔
 **XA2**	✔	✔		✔		
 **XS2**	✔	✔		✔		
 **XT2**	✔	✔	✔	✔		
 **Lx**	✔	✔	✔	✔		
 **XP2**			✔			

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio USA

F A B

FEATURES	ADVANTAGES	BENEFITS
Mobility	Tested for rugged mobile environments. Integrated mobile interfaces.	Hardware tested to mobile standards and designed to control proportional hydraulics increases the machine's effectiveness.
Simplicity	User-friendly, graphical software tools. Graphical, easy to use diagnostic tools. Software simulation.	User programmable tools reduce personnel costs. Specialized programmers are not needed. Software simulation reduces testing time and increases safety.
Time to market	Product development based on standard hardware. Easy to use graphical programming tools.	Standard, tested hardware for mobile environments reduces development time. User-friendly software tools reduce programming time.
Machine management	Easy to use fault finding and diagnostic tools. Data storage and transfer. Remote diagnostics via modem.	Clear text error messages, error logging and diagnostics reduce field personnel skill levels. Technicians do not need to be engineers. Modem connection allows remote diagnostics and application updates to eliminate service trips.

L C S

L IFE CYCLE	**C** OST	**S** AVINGS
Development	Design engineering, developing a controller program, prototyping and testing are typically huge investments of time and resources. Maintaining a dedicated programming staff (or hiring temporarily) is also expensive.	IQAN hardware is tested to mobile standards, user programmable software and software simulation reduces development and test time. With IQAN, no specialized programmers are needed.
Production	Many controllers that are put into real world conditions are not reliable enough to build consistently in serial production, resulting in delays and redesigns. Others may work, but are difficult to optimize for the task at hand.	IQAN's reliable, robust hardware withstands the rigors of outdoor use and enhance production. Our hardware is designed for mobile machine functions and is easy to tune; to make every machine more effective and productive.
After-sale support	Travel costs to service machines and the parts and labor involved make field service calls expensive. Training a field service force is also a costly undertaking, especially when they need to be Electrical Engineers to deal with the intricacies of a control system.	IQAN modem connectivity allows remote diagnostics and application updates to reduce or eliminate service trips. Our reliable, modular hardware decreases parts and labor costs. Clear text error messages, error logging and diagnostics reduce field personnel skill levels. Technicians do not need to be engineers.
Machine owner/operator	Unreliable and difficult to diagnose systems increase downtime and reduce overall productivity.	IQAN is designed and tested for rugged mobile environments. Easy to use graphical diagnostic tools and graphical operator interfaces reduce diagnostic time.

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