

BEVER CONTROL AS

# User manual BeverDrill

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BeverWIN2010

**Version 1.0**

**15.09.2011**

## BeverDrill User Manual

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## BeverDrill

## User Manual

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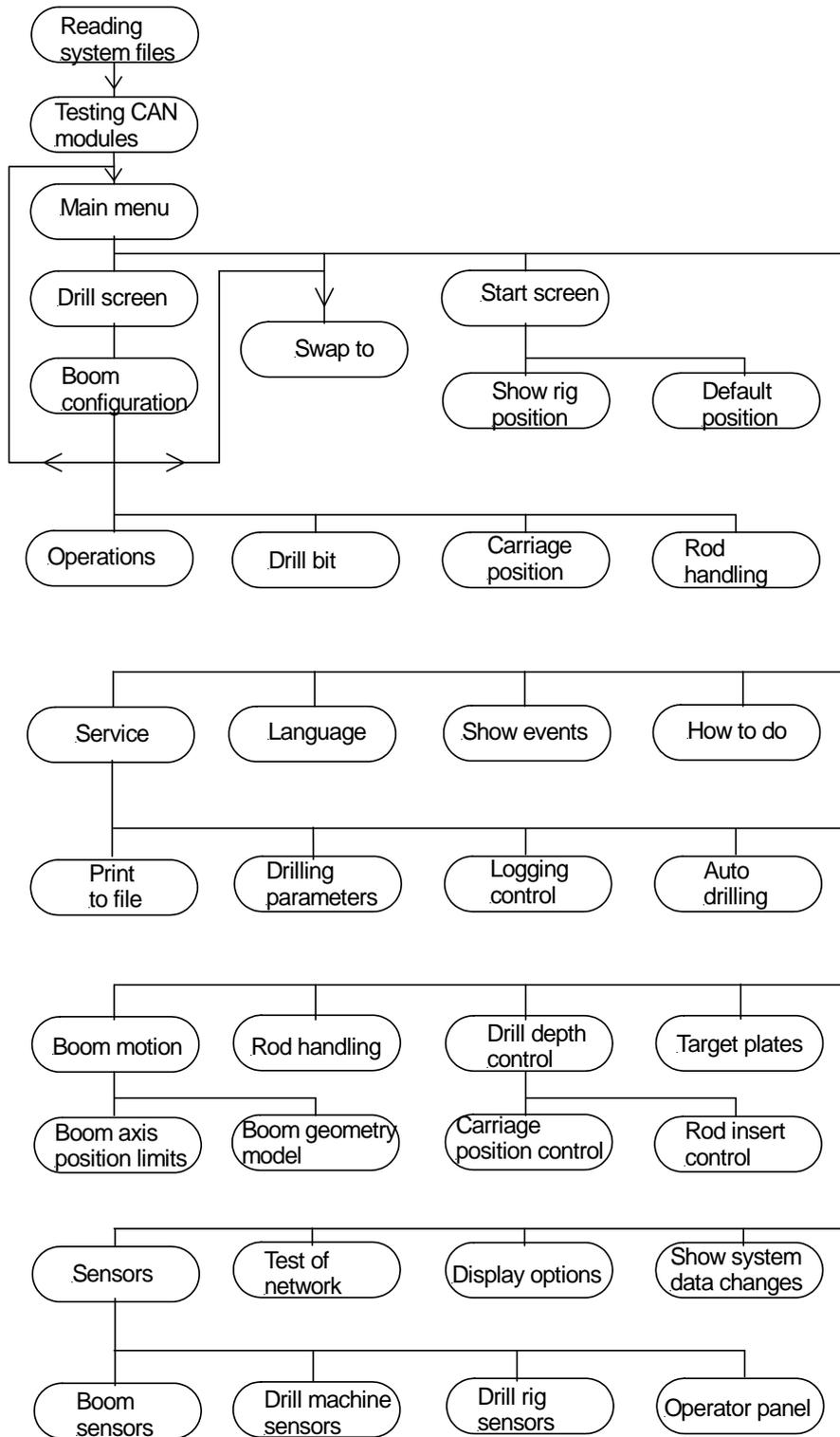
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# 1 BeverDrill

## 1.1 General information for the menus

The menus in BeverDrill are connected together as shown below. From a menu it's possible to get back to the previous one except for the ones marked with arrows.



## 1.2 Main menu

**Bever Control**  
 Gunnersbraatan 2 Telephone: "+47 32858960"  
 N-3421 Lierskogen Telefax: "+47 32858961"  
 P.O.Box 20 E-mail: mail@bevercontrol.com  
 Norway Web: www.bevercontrol.com

AMV 21SGBC-CC ( 11-2944 ) 11261 BEVER DRILL: Nov 1 2010 07:30:05 RigCtrl: WRONG VERSION!

**Drilling Terminal** F23: Swap to

F1: How to do

F5: Select language

F7: Service: Display/modify system data F9: Show events

F8: Navigating

**Start drilling with:**

PROBE <tom>  
 BOLT <tom>  
 INJECTION <tom>  
 NORMAL DemoBorplan

F11: Continue drilling F12: Erase old log Start new round

### F11: Continue drilling

Enters drill screen without erasing logged holes. Used when part of the round is already drilled.

### F12: Erase old log. Start new round

Enters drill screen with all logged holes erased. Used when starting a new round.

### F7: Service

Sensor surveillance and parameter settings. See Service Manual for details.

### F8: Navigating

Shows navigated position, or jumbo can be navigated to standard position (face straight in front of jumbo, used for test purpose)

### F9: Show events

Shows the list of events like error messages, warnings and system information

### F23: Swap to

Swap to BeverPlan and BeverProfiler programs.

### 1.2.1 Main menu - Start screen

14:12 Drill rig sensors Drill rig rotation

**Bever Control**

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N-3421 Lierskogen Telefax: "+47 32858961"  
P.O.Box 20 E-mail: mail@bevercontrol.com  
Norway Web: www.bevercontrol.com

AMV 21SGBC-CC ( 11-2944 ) 11261 BEVER DRILL: Aug 18 2011 12:41:56 RigCtrl: May 11 2011 10:56:33

Drilling Terminal F23: Swap to

Do from: Bever Plan

- Navigate Drill rig
- Select drillplan
- Start drilling

F1: Show drill rig position F10: Default position

F12: MAIN MENU Menu for: Start drilling with old plandata

This start screen appears if there is no communication with BeverPlan during start-up. It's also possible to get to this menu if BeverPlan has been started but no other menus have been chosen, and F8:Navigating has been selected in the main menu in BeverDrill.

#### F1:Show drill rig position

Shows how the drill rig is navigated. Same screen is shown during navigation in BeverPlan.

#### F10:Default position

It's possible to navigate the drill rig to a default position. The face is defined at a given distance and height straight in front of the rig.

1.2.1.1 Main menu - Start screen - Navigating

The screenshot displays the BeverDrill navigation interface. It features two 3D grid-based views of a tunnel structure. The top view shows a vertical tunnel with a red line labeled 'Tunnel laser' and a cyan line labeled 'Tunnel line'. A red box labeled 'Reference plane (Face)' points to a horizontal plane. The bottom view shows a horizontal tunnel with a red line labeled 'Tunnel laser' and a cyan line labeled 'Tunnel line'. A red box labeled 'Reference plane (Face)' points to a vertical plane. On the right side, there is a control panel with the following sections:

- Navigating**
  - Drill rig rotation: 0.00 deg
  - Drill rig tilt forward: 0.00 deg
- Face rel. to Drill rig**
  - Position
    - Forward: 10.00 m
    - Left: 0.00 m
    - Up: -2.50 m
  - Direction matrix

$\downarrow \times$	$\downarrow \downarrow$	$\uparrow \downarrow$
1.000	0.000	0.000
0.000	1.000	0.000
0.000	0.000	1.000
- Buttons: F6: Swap to (with a yellow square icon), F12: CLOSE

This screen shows the navigation of the jumbo. It's shown during the navigation in BeverDrill or if chosen as described in the previous chapter.

### 1.2.2 Main menu - Start screen - Default position

The screenshot displays the BeverDrill main menu interface. It features a central grid area with two panels: 'Jumbo Position relative to face' (top) and 'Face rel. to Jumbo' (bottom). The top panel shows a 'Tunnel laser' (red line) and a 'Tunnel line' (blue line) relative to a 'Face' (red 'x' marks). The right panel shows 'Face rel. to Jumbo' with values: Forward 11.00 m, Left 0.00 m, Up -2.50 m. Below this is a 'Default position' section with a green bar showing '11.00' and a numeric keypad. The bottom panel shows 'F10: Default position', 'F11: Navigated position', and 'F12: CLOSE' buttons. A second grid area at the bottom shows a different view of the tunnel and face, with labels for 'Tunnel laser', 'Tunnel line', and 'Face' pointing to specific elements.

This screen shows the navigation of the drill rig. It's possible to switch between last rig navigation and default navigation. For default navigation the face is defined at a given distance and height straight in front of the rig.

F10:Default position

The rig is navigated with the face position according to the numbers for Forward, left and Up in upper right corner.

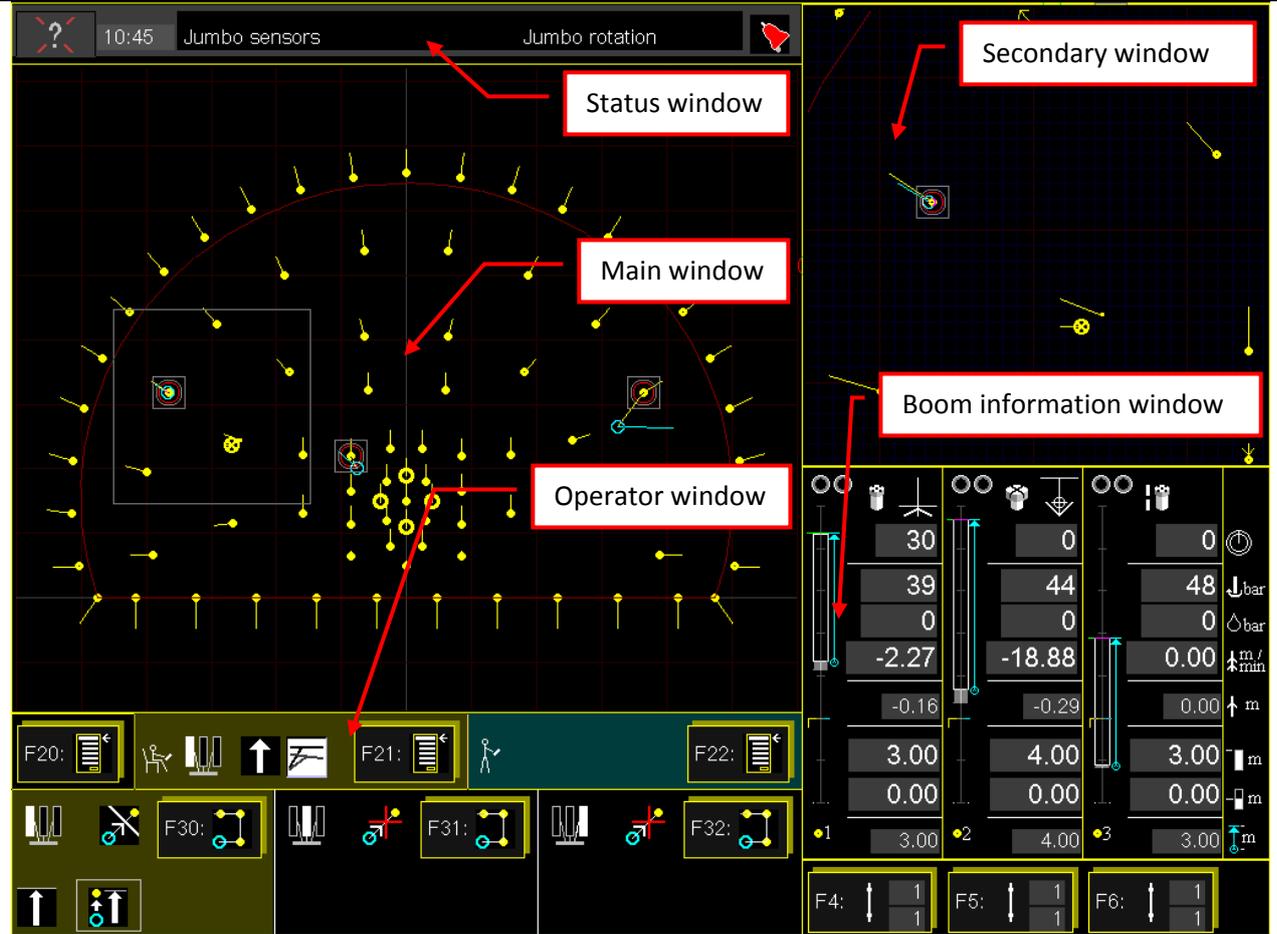
F11:Navigated position

Navigates to the last received navigation from BeverPlan

F12:Close

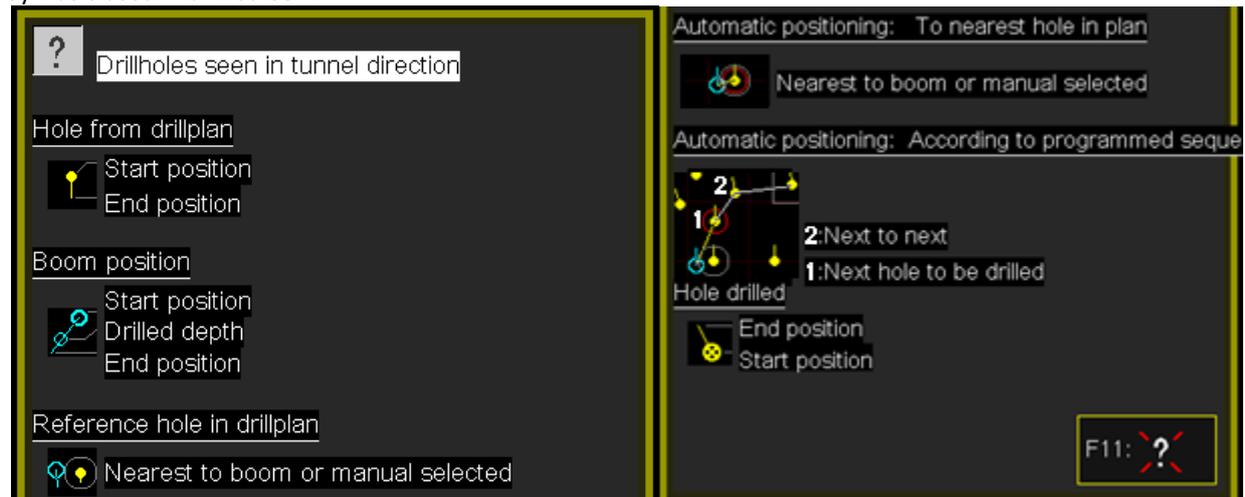
Returns one level up in the menus.

### 1.3 Drill screen



The drill screen consists of five parts as shown above. There are several different layout options for the main and secondary windows. Different setup for each boom through buttons F4:, F5: and F6:.. See next chapters for details.

Symbols used in drill screen:



### 1.3.1 Main window

F24:  Main window can display the drill pattern in four different ways. The different views are selected in the boom configuration menu. Use F21: to F24: as shown to the left.

F23:  See chapter 1.3.6 Boom configuration menu.

F22:  The different views are shown below.

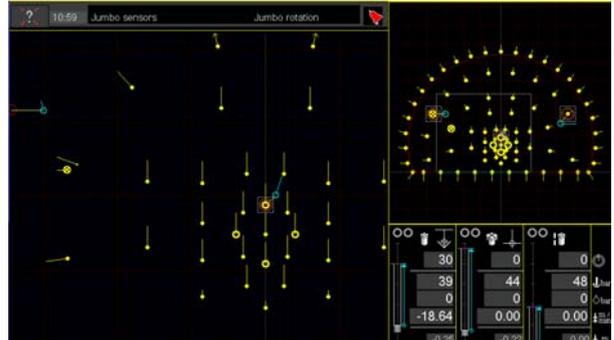
F21: 

F21: Normal view



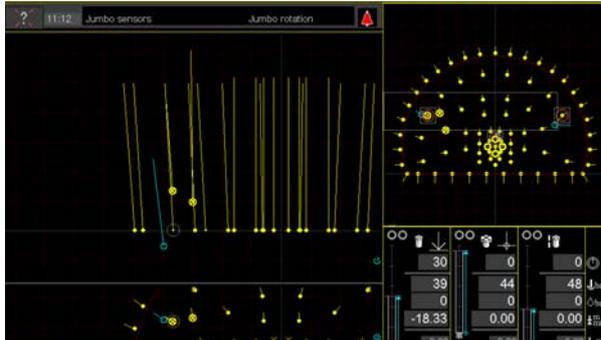
The complete drill pattern is shown. Normal view for the side booms.

F22: Zoomed in



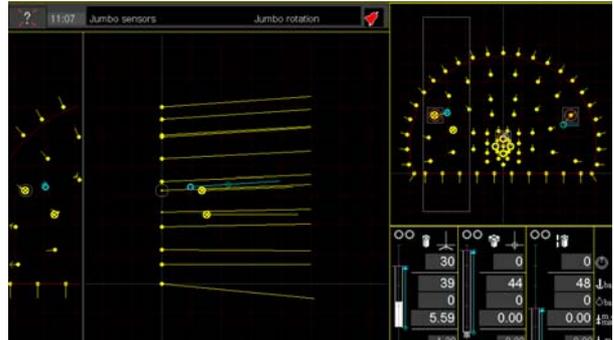
The area around the boom is zoomed in. Often used for the centre boom when drilling the cut.

F23: From above



The holes inside the gray frame in the secondary window are zoomed in the bottom of the main window. In the top of the main window are the same holes shown from above. The blue mark for the boom shows that the feeder is behind the reference plane and the holes are drilled a fixed length.

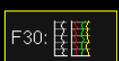
F24: From the side

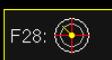
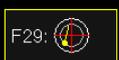


The holes inside the gray frame in the secondary window are zoomed in on the left side in the main window. To the right in the main window are the same holes shown from the side. The blue mark for the boom shows that the feeder is forward of the reference plane and the holes are drilled a fixed length.

### 1.3.2 Secondary window

F31:  The secondary window can display the drill pattern or a zoomed in part of it. Other alternatives are two different sight views, drifter parameters, pressure trends and pressure values as numbers.

F27:  F30: 

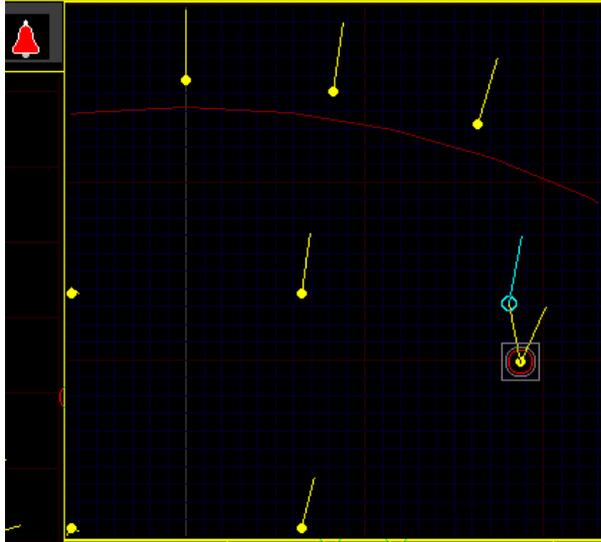
F28:  F29: 

F26:  The different views are selected in the boom configuration menu. Use F26: to F31: as shown to the left.

See chapter 1.3.6 Boom configuration menu.

The different views are shown below.

F26: Zoomed in view



The area around the boom is zoomed in. Normal view for the side booms.

F31: Drill sensor values

↓ Rota. revolution	0 rpm
↓ Rota. pres.	39 bar
↑ Feed pres.	125 bar
↑ Perc. pres.	0 bar
💧 Water flow	0 l/min
💧 Water pres.	0 bar
↑ Feed penetr	5.67 m/min
↑ Carriage pos.	0.63 m

Shows current values for all drill sensors for the boom.

F28: Sight parallel view



Shows the angle between the feeder and a reference. See details to the right for reference explanation.

The numbers in the view are:

Top Left: Radius outer and inner circle

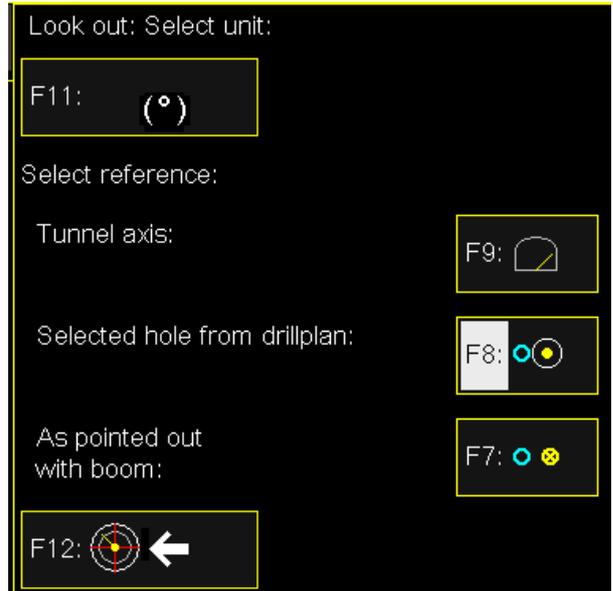
Left side: Deviation in position( from top)

- Forward
- Sideways
- Up
- Vector sum

Right side: Deviation in direction (deviation in bottom of hole)

- Sideways
- Up
- Vector sum

Sight parallel view details



F11: Select unit degrees or meter for deviation in direction

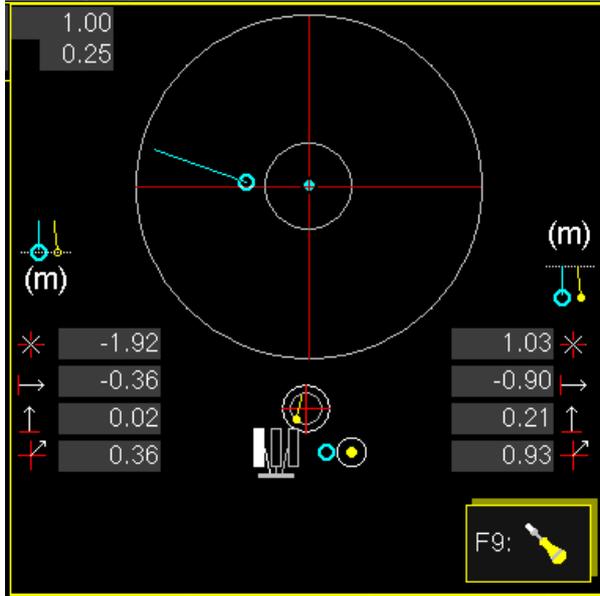
F7: Reference is set to current feeder direction  
Used when drilling a cut without using the drill pattern. The first hole is set as a reference, then the values in the Sight parallel view are used to control the distance between the holes in the cut.

F8: Reference is set to nearest hole in drill pattern

F9: Reference is set to tunnel line

F12: Activates the new reference. Must be pressed when a new reference is selected.

F29: Sight position view

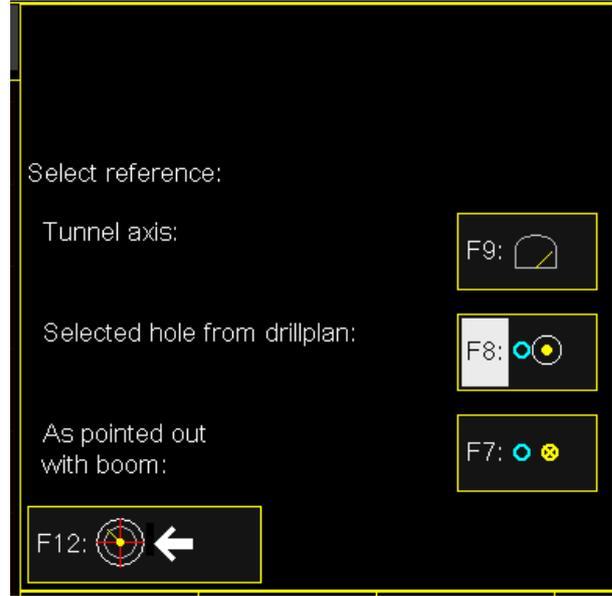


Shows deviation in position and angle between the feeder and a reference. See details to the right for reference explanation.

The numbers in the view are:

- Top Left: Radius outer and inner circle
- Left side: Deviation in position (from top)
  - Forward
  - Sideways
  - Up
  - Vector sum
- Right side: Deviation in bottom of hole)
  - Forward
  - Sideways
  - Up
  - Vector sum

Sight position view details



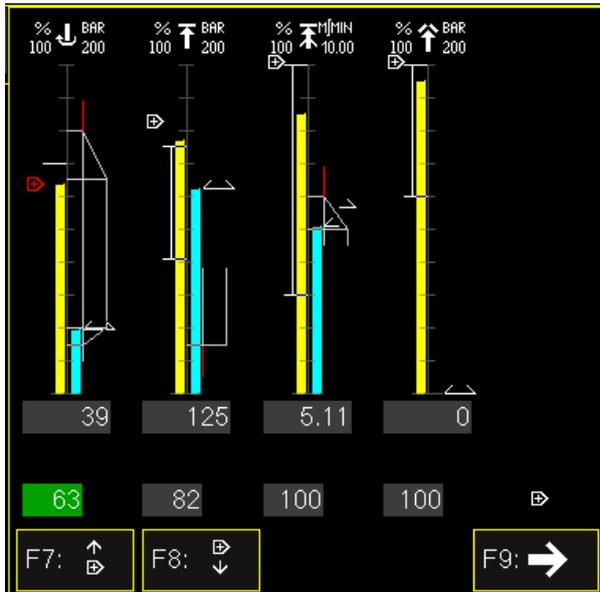
F7: Reference is set to current feeder direction

F8: Reference is set to nearest hole in drill plan  
Used to drill very accurate. Can effectively be combined with zoomed view in main window when drilling the cut.

F9: Reference is set to tunnel line

F12: Activates the new reference  
Must be pressed when a new reference is selected.

F27: Drifter control view



The view shows (from left) rotation pressure, feeder pressure, feeder speed and percussion pressure. The yellow bar on the left is the valve opening and the blue bar on the right is the measured value. More details below.

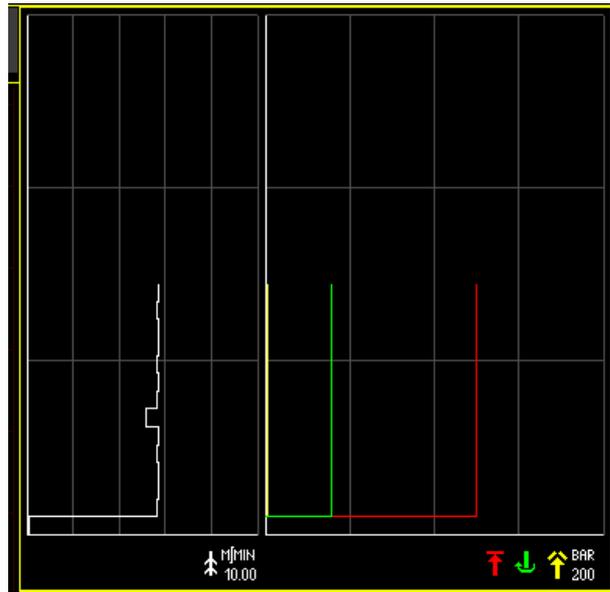
The view shows (from left) rotation pressure, feeder pressure, feeder speed and percussion pressure

F7: Increase valve opening

F8: Decrease valve opening

F9: Select valve

F30: Drifter trend view



Shows the variations in sensor values as trends when drilling. The sensors are:

- Red Feeder pressure
- Green Rotation pressure
- Yellow Percussion pressure
- White Penetration rate

Adjusted valve opening

Factory setting normal drilling

Factory setting collaring

Factory setting for collaring and full speed are equal

Adjusted valve opening

Values for anti-jamming control

Sensor values

Valve setting

Increase valve opening

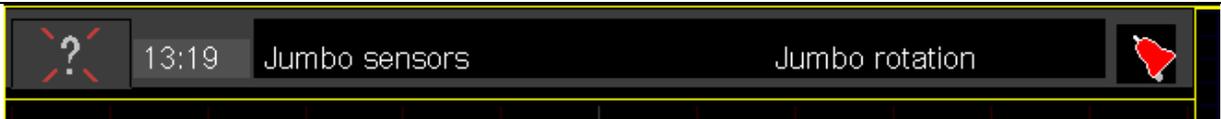
Decrease valve opening

Values for detecting opening in the rock

Values for maximum penetration rate

Select valve to adjust

### 1.3.3 Status window



The status window has a "?" field that activates help. Touch the mark and then the window in question.

The last alarm is shown and if there is an unacknowledged alarm the bell will move. There are different type of alarms like:

- Angle sensor input
- Angle sensor range
- Pressure sensor input
- PVG valve errors
- Shank oil errors
- Water flow
- Emergency stop
- AMV system errors

### 1.3.4 Boom information window

The drill data window shows a lot of information about the drilling and the configuration of each boom. In the upper part is the lamp for hole finished, selected drill bit and drifter state. On the left side is a graphical presentation of the hole being drilled. On the right side is the numbers for the same.

The screenshot displays three columns of data for different booms. Each column includes a graphical representation of a hole on the left and numerical data on the right. The data fields are as follows:

Column 1	Column 2	Column 3
Wanted depth: 0	Wanted depth: 30	Wanted depth: 40
End of hole: 39	End of hole: 44	End of hole: 48
Drilled depth: 0	Drilled depth: 0	Drilled depth: 0
Drill bit position: 5.67	Drill bit position: 5.68	Drill bit position: 5.68
Feeder position: 0.83	Feeder position: 1.16	Feeder position: 2.10
Reference plane: 1.77	Reference plane: 4.00	Reference plane: 3.60
Drill depth set by operator: 0.78	Drill depth set by operator: 1.11	Drill depth set by operator: 2.05
Drill depth set by operator (collaring): 1.77	Drill depth set by operator (collaring): 4.00	Drill depth set by operator (collaring): 3.60
Drill depth from nearest hole: 1.77	Drill depth from nearest hole: 4.00	Drill depth from nearest hole: 3.60

Labels pointing to the graphical elements include: Drill depth reached or end limit switch, Meter marks, Wanted depth, End of hole, Drilled depth, Drill bit position, Feeder position, Reference plane, Drill bit, see chapter, Drill depth set by operator, measured from reference plane, Drill depth set by operator, measured from collaring position, Drill depth from nearest hole in drill pattern, measured from reference plane, Drifter and drill stick state, see chapter Feil!, Collaring speed, Rotation pressure, Water pressure, Penetration rate, Drifter position, Hole depth, Drill bit position, and Wanted depth.

### 1.3.5 Operator window

The upper line of the operator window shows current operations for the chair and standing consol. The highlighted icon shows what's currently activated. If the background is black, the panel is not connected to a boom.

To the left is a general information button (F20:) and for each operator there are context sensitive information buttons (F21: and F22:). The information depends on the current operation of the joysticks, if boom movement, drilling or rod changing is selected. See chapter 1.3.5.2 to **Feil! Fant ikke referansebildene.** for details.

The lower part shows automatic drilling information for each boom and possible operations. The background colour for a consol and the connected boom is the same. If the background is black the boom is not connected to a operator panel.

Boom movement is activated. See 1.3.5.2

Parallel operation is drilling

Connected boom

Chair consol

Standing consol

Parallel operation rod handling is activated

Auto state, see icon list

Auto on with acknowledge for each hole

Auto on

Boom No.

Auto off

Auto is on but no sequence, "Auto to nearest hole" or "Only drill" is possible.

F20: General information joysticks, see chapter See 1.3.5.1

F21: - F22: Menu description, changes with activated joystick function. See chapter 1.3.5.2 to 1.3.5.4

F30: - 32: Auto menu for each boom, see **Feil! Fant ikke referanseilden.**

**1.3.5.1 General information**

Below is a description of the icons in the following chapters. The highlighted (white) button is the function key used for the activating a joystick menu or operation.



Left hand joystick



Right hand joystick



Function key F1



Function key F1



Function key F2



Function key F2



Function key F3



Function key F3 (joystick menu)

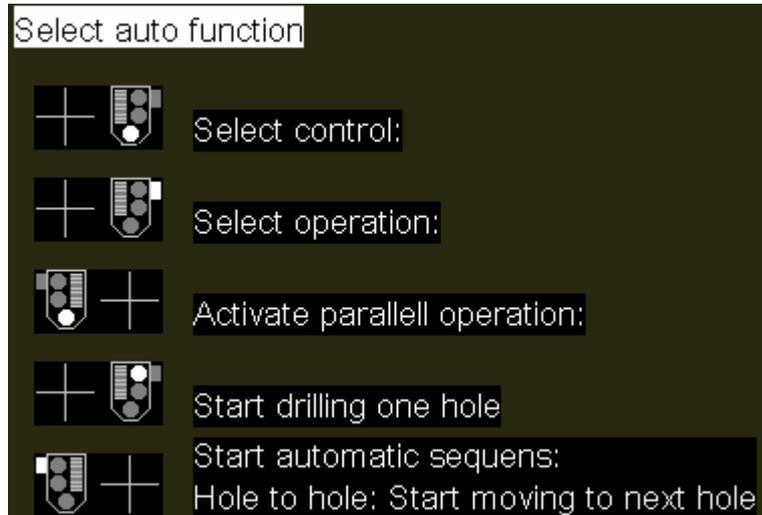


Function key F4



Function key F4 (joystick menu)

Independent of the state of the joysticks, the options shown in the figure below always have the same meaning. This does not imply that they will always generate a response. The meaning is as described in the following chapters.



1.3.5.1.1 Select control



Activates the control select menu. Press the button, release it and then do one of the following movements with the right hand joystick. The control selected is based on the position of the joystick when returned to the neutral position.

- Press the same button and the menu closes
- Select boom 1
- Select boom 2
- Select boom 3
- Select the basket
- Select left hand search light (option)
- Select right hand search light (option)
- Not in use
- Not in use

1.3.5.1.2 Select operation



Activates the select operation menu. This menu will only work if a boom is already selected. Press the button, release it and then do one of the following movements with the right hand joystick. The operation selected is based on the position of the joystick when returned to the neutral position.



Press the same button and the menu closes



Activates drilling with moving as parallel operation



Activates rod handling with moving as parallel operation



Move bolting axis to the end position or enables moving of the bolting axis



Water in auto, on and off is controlled by the drilling system



Water on



Water off



Not in use



Not in use

### 1.3.5.1.3 Activate parallel operation



Activate parallel operation:

Changes joystick mode between drilling and moving or rod handling and moving.

### 1.3.5.1.4 Start drilling only



Start drilling one hole

Starts collaring and changes automatically to normal drilling after a preset distance. The distance is set in the service menu.

### 1.3.5.1.5 Start automatic movement



Start automatic sequens:  
Hole to hole: Start moving to next hole

When system power is turned on, automatic drilling is default off. In this case this button does not work. With automatic drilling enabled this button works as follow:

No sequence	The boom will move in front of the closest hole in the drill pattern. Then move forward to the rock, drill the hole and retract from the rock. When the hole is finished, a small movement of the boom in direction of the next hole to be drilled is enough to select a new hole.
Sequence with confirmation	The boom drills the first hole in the sequence as described above, then wait for the button to be pressed again before moving to the next hole in the sequence.

Sequence without confirmation	All holes in the sequence are drilled continuously.
-------------------------------	---

The distance to and from the rock is set in the service menu.

Automatic drilling can always be aborted by moving the drill stick for the boom backwards.

The operator can always override the machine and do for instance the positioning himself if the rock condition is tricky. The sequence is continued when the button is pressed again.

### ***1.3.5.2 Movement information***

Moving the boom and feed are done as follow:

Moving boom

 Boom swing

 Boom lift

 Boom ext.

 Feed swing

 Feed lift

 Feed ext.

 Feed rotation

 Feed stick

### ***1.3.5.3 Drifter functions***

When the joysticks are in drilling mode, there are the following possible operations:

Drilling	
	COLLAR: From STOP 10-100 % From DRILL: 10-90% 0.5 s
	DRILL: From COLLAR 90-100 %
	STOP: 10-90% 0.5 s
	RETURN: 90-100%
	Increase/decrease drifter speed
	Drifter rotation
	Drifter forward/backward
	Percussion + water
	Percussion

It is possible to combine drifter rotation, forward/backward movements, percussion and water.

In this mode the drifter will always rotate when operations are finished. To change drill bit use rod handling mode.

---

**1.3.5.4 Rod handling functions**

When the joysticks are in rod handling mode, there are the following possible operations:

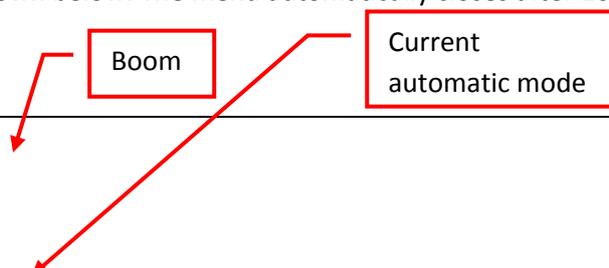


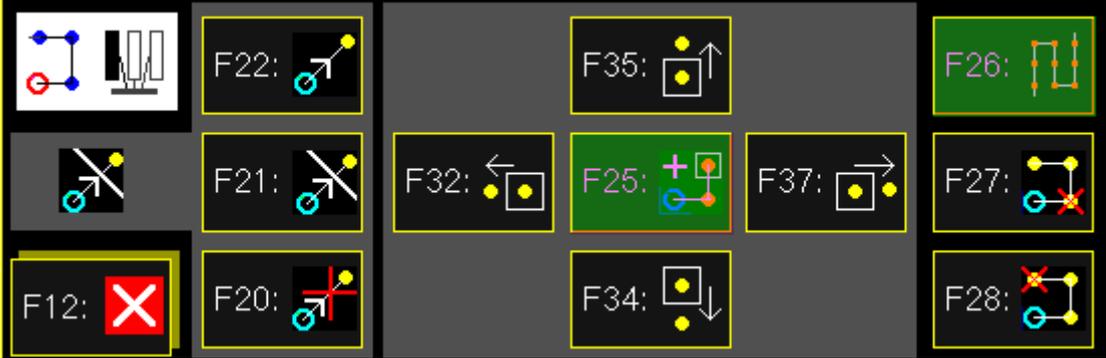
It is possible to combine drifter rotation, forward/backward movements, percussion and water.

To disconnect drill bit or rod string, rod handling is used because in this mode the drifter is not rotating when operation is finished.

#### 1.3.5.5 Auto menu

Auto drilling is default off when system is powered on. When one of the auto menu buttons F30:, F31 or F32: in the **Feil! Fant ikke referansebildet.** (see chapter **Feil! Fant ikke referansebildet.**) is pressed you get the menu shown below. The menu automatically closes after 10 seconds of inactivity.





The screenshot displays a grid of function keys (F12-F37) with their respective icons and descriptions. The keys are arranged in a grid with a dark background and yellow borders. The icons represent various functions such as closing the menu, automatic mode on/off, moving the sequence cursor, adding holes to the sequence, and deleting holes from the sequence.

F12: Closes the menu

F20: Automatic mode off

F21: Automatic mode with confirmation for each hole

F22: Automatic mode without confirmation for each hole

F32:, F34:, F35:, F37: Moves the sequence cursor

F25: Adds the hole to the sequence for the boom

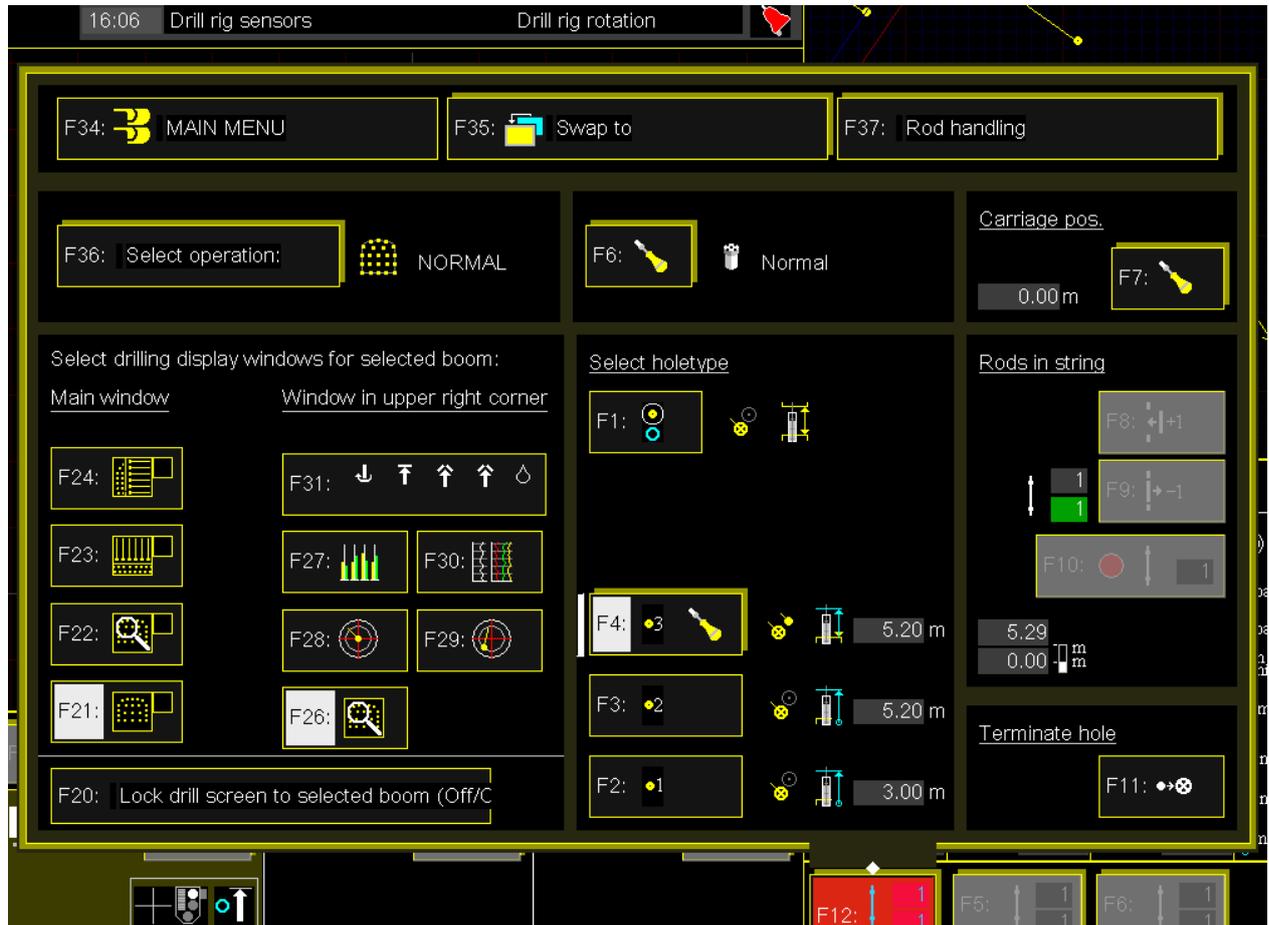
F26: Adds 5 next holes from sequence generated in the office

F27: Delete first hole in sequence

F28: Delete last hole in sequence

### 1.3.6 Boom configuration menu

For each boom it is possible to set different parameters. To configure settings for a boom press button F4: - F6: in the Drill data window.



F21: - F24: Selects the view for the main window, see chapter 1.3.1

F26: - F31: Select view for secondary window, see chapter 1.3.2

F20: Locks the screen to this boom

F1: - F4: sets the drill depth. This can be selected independently for each boom, but the settings for extra holes type 1 - 3 (buttons F2: - F4:) are similar for all booms. See next chapter for more details.

F34: Go to main menu, see chapter 1.2

F35: Change to BeverPlan if only one computer

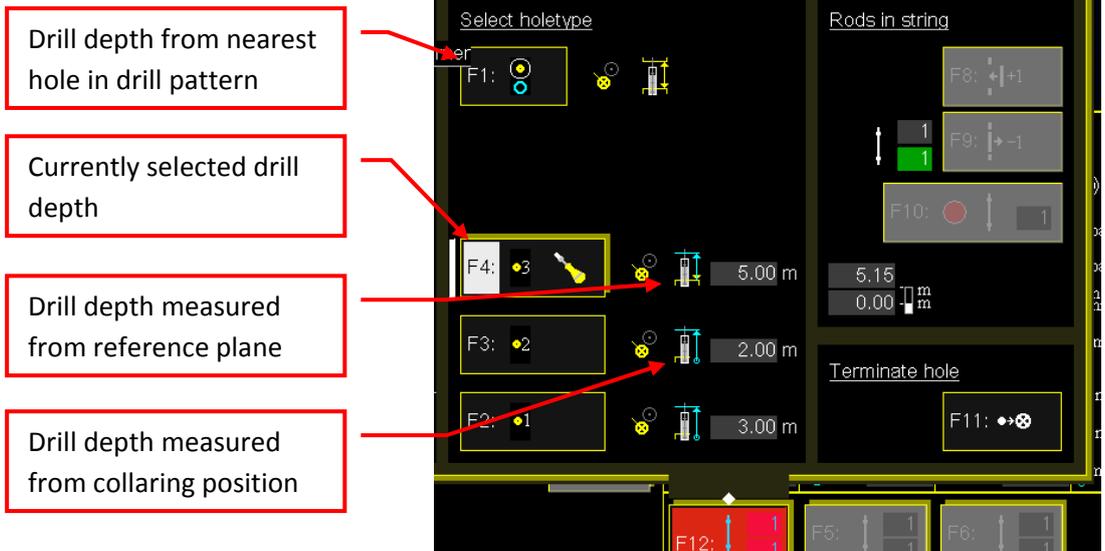
F36: Select between normal drilling, bolting, injection and probe

F6: Current drill bit (parameter set)

F7: Reset drifter position

F11: Terminates and logs the hole on command. This is done automatically when drilling depth is achieved and the drifter is fully returned. For a hole that is aborted by the operator before the full depth is achieved a hole is logged when feeder is moved 20 centimetres to the side. F11: should be used when a long hole is aborted and should be pressed before removing rods start.

1.3.6.1 Drill depth



F1: Drill depth is controlled by nearest hole in the drill pattern and depth is measured from the reference plane. It is possible to have different depths for different holes to make a curved bottom for the round.

F2: - F4: Hole parameters are selected by the operator. The settings for these three are the same for all three booms, but the selection is independent for each boom . Operator can select drilling depth, if the depth shall be measured from collaring position or reference plane, and if the nearest programmed hole in the plane shall be removed or not. The currently selected one is highlighted, and can be adjusted by touching the button. How to adjust is described below.

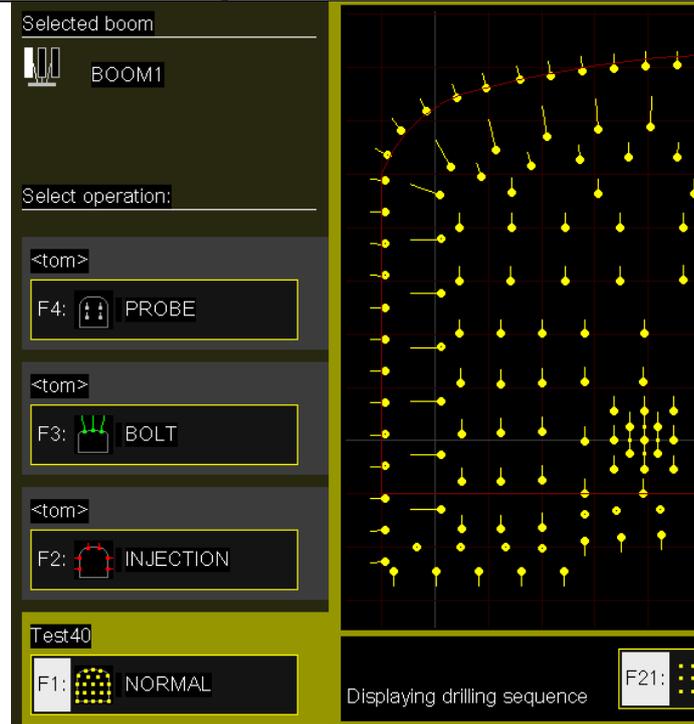


F1: Toggles between measuring from collaring position and reference plane.

F2: Toggles removing of the nearest hole in the drill plan on and off.

To change the drill depth, type the new value and press Enter. The press F11: to close the keyboard or F12: to close Boom configuration menu.

### 1.3.6.2 Select operation

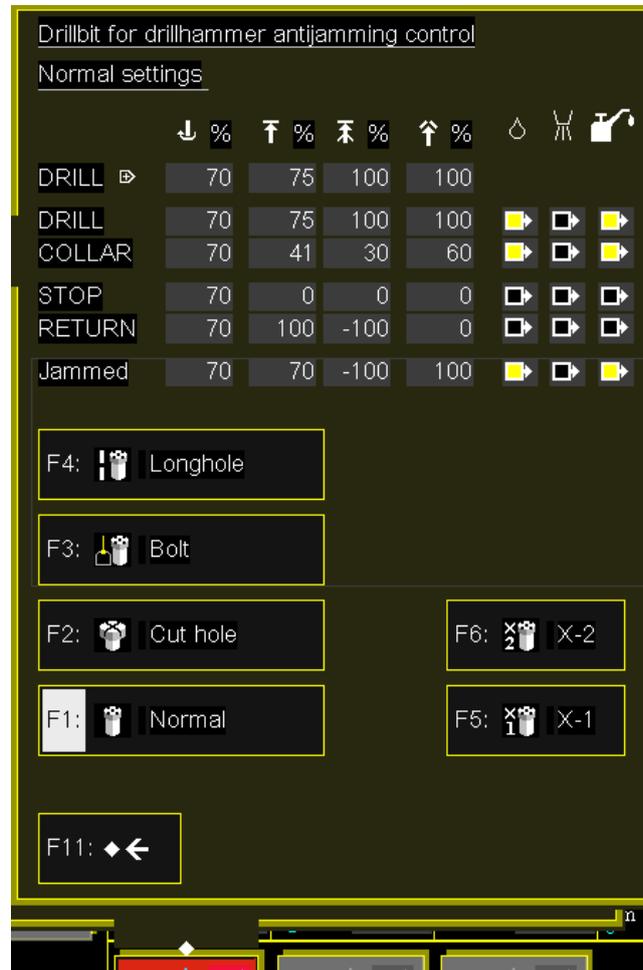


There are four different types of operations. These are normal drilling, injection, bolting and probe drilling. It is possible to use one drill plan for each operation and different operations for each boom.

Drill pattern and logged holes are coloured as shown below.

- Normal
- Injection
- Bolt
- Probe

### 1.3.6.3 Select drill bit

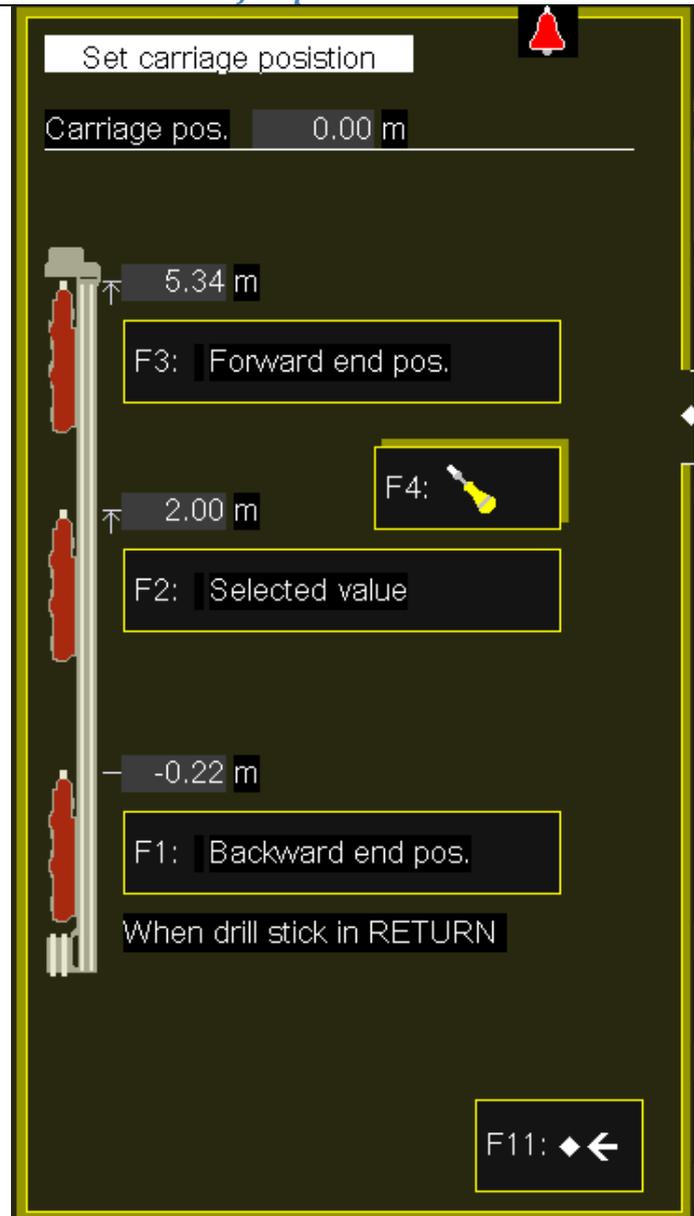


There are four standard drill bits, or more correctly parameter sets for drill bits. These are normal drilling, cut hole, bolting and long hole.

In addition there are two more sets that can be used for special purpose or testing named X-1 and X-2.

The parameters for the chosen drill bit is shown, changing the parameters are done in the Service menu.

**1.3.6.4 Reset drifter position**



F1: Resets the drifter position in the backward position. The return pressure must be on. The reset value is approximately -20 centimetres.

A negative value is used because the sensor for the drifter position is measuring the oil flow in the return oil line. When the drifter stops in backward position with pressure on the return line is filled with excess oil. When the pressure is released, oil will flow through the sensor without moving the drifter. This oil volume represents a movement of approximately 20 centimetres.

F3: The drifter position can also be reset in its forward position.

**1.4 List of status icons**

<b>1.4.1 Drilling</b>	
	Drifter stopped
	Drifter in collaring
	Drilling with reduced power because of speeding up from collaring to normal drilling mode or reduced because of to high rotation pressure.
	Drifter in normal drilling
	Drifter returning

	Drifter returned automatically when hole depth was achieved and then stopped
	<b>1.4.2 Anti jamming</b>
	Drifter moves back because of jamming
	Drifter has moved back because of jamming and is now flushing hole with water a preset time.
	Drifter has moved back and flushed hole with water because of jamming and is moving forward in collaring again.
	Maximum time for anti jamming has run out. Start again manually.
	<b>1.4.3 Drill speed control</b>
	Drilling with reduced power because of to high penetration rate.
	An opening in the rock has been detected (feed pressure to low) and drifter is drilling in collaring until feed pressure is above limit for normal drilling.
	Maximum time for feed pressure control has run out. Start again manually.
	<b>1.4.4 Other icons</b>
	Blowing air a set time in the bottom of the hole
	Flushing with water a set time in the bottom of the hole
	Water flow is to low, drilling is stopped
	No shank oil, drilling is stopped
	<b>1.4.5 Auto drilling</b>
	Auto is off
	Auto is on. Acknowledge before moving to next hole.
	Auto is on. Sequence is run continuously.
	Boom is movint towards a hole
	Feeder moves against the rock
	Boom is drilling in auto

	Feeder moves away from the rock	
	Auto drilling is in progress.	
	"Drill only" is in progress. Drills in collaring, speeds up to normal drilling after a set distance and retracts the feeder a set distance when drifter has returned. Different parameters for different hole types.	

## 1.5 Startup screens

Before the main menu appears the system shows two start-up screens. If everything is ok the program continue automatically to the main menu.

### 1.5.1 Reading system files



The screenshot shows the Bever Control startup screen. At the top left is the Bever Control logo. To the right of the logo is contact information: Gunnersbraatan 2, N-3421 Lierskogen, P.O.Box 20, Norway. Telephone: "+47 32858960", Telefax: "+47 32858961", E-mail: mail@bevercontrol.com, Web: www.bevercontrol.com. Below this is a status bar: AMV 21SGBC-CC ( 11-2944 ) 11261 BEVER DRILL: Oct 14 2010 14:56:18. The main area is titled "Reading system files" and lists two files: C:\Bever\_Simulator\_2010\_Auto\Programs\DATA\11261\_System.sd (File OK) and C:\Bever\_Simulator\_2010\_Auto\Programs\DATA\11261\_DrillParams.sd (File OK). Below this is "Startup: System". At the bottom, there are two buttons: "F23: Swap to" and "F12: CONTINUE".

Just after starting up the system the program reads two important system files. If anything is wrong with these files, the program stops and an error message is printed on the screen.

If this happens the defect file must be reloaded from the system file menu in BeverPlan. In BeverPlan do:  
F2:To start - F11:Operations - F8:System files

Use F4:Open to reload system data

Use F7:Open to reload drill data

## 1.5.2 Testing CAN modules

16:32 Drill rig sensors Drill rig rotation

**Bever Control**  
 Gunnersbraatan 2 Telephone: "+47 32858960"  
 N-3421 Lierskogen Telefax: "+47 32858961"  
 P.O.Box 20 E-mail: mail@bevercontrol.com  
 Norway Web: www.bevercontrol.com

AMV 21SGBC-CC ( 11-2944 ) 11261 BEVER DRILL: Aug 18 2011 12:41:56

Testing CAN modules

CAN modul	State	Time(sec.)	CAN modul	State	Time(sec.)
BOOM1 A-BOX	Connecting to	2.1	Panel 1 BOOM1	Connection OK	2.6
BOOM1 B-BOX	Connection OK	2.1	Panel 1 BOOM2	Connection OK	2.7
BOOM1 CD-BOX MC1	Connection OK	2.3	Panel 1 BOOM3	Connection OK	2.6
BOOM1 CD-BOX MC2	Connection OK	2.4	Panel 1 Stick Left	Connecting to	2.1
BOOM2 A-BOX	Connection OK	2.5	Panel 1 Stick Right	Connecting to	2.1
BOOM2 B-BOX	Connection OK	2.5	D-BOX ( CE-kort)	Connecting to	2.1
BOOM2 CD-BOX MC1	Connection OK	2.6	D-BOX ( CE-kort NET)	Connecting to	2.1
BOOM2 CD-BOX MC2	Connection OK	2.7			
BOOM3 A-BOX	Connection OK	2.7			
BOOM3 B-BOX	Connection OK	2.7			
BOOM3 CD-BOX MC1	Connection OK	2.6			
BOOM3 CD-BOX MC2	Connection OK	2.6			

When the program has verified the system files, it will continue with connecting to all CAN modules. The program waits until all modules have answered. If a module is not responding it is possible to continue to the main menu by pressing F12:Continue as long as it's not the D-box that failed.

Depending of the module that is not responding, the system can still be operated.

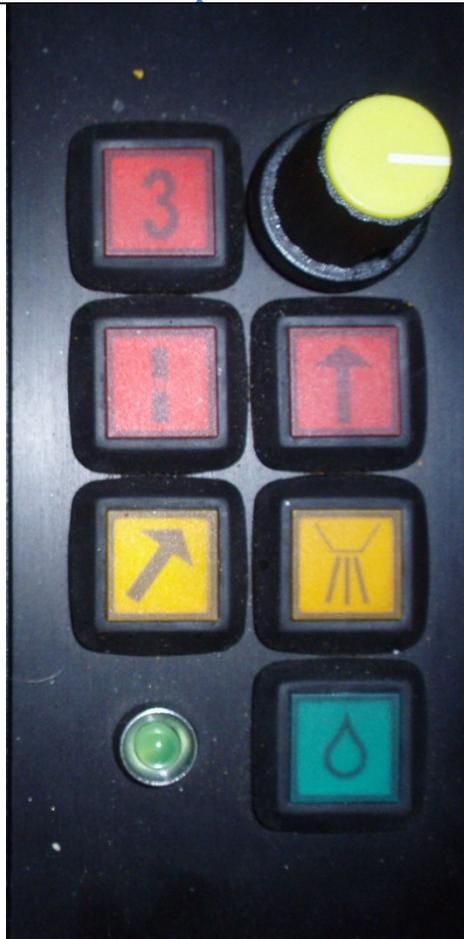
This screen appears automatically if a module stops communicating during drilling.

It's recommended to navigate the drill rig before continuing to the drill screen if the rig has been moved. If the rig has not been moved it's not necessary to navigate again, but it's recommended to press F29:Log in BeverPlan before starting the drilling.

## 1.6 Operator panel

The system can be operated with the joysticks and the switch panel. Both are active all the time so it's possible to use a mixed combination if wanted.

### 1.6.1 Switch panel



Left row of buttons have the following functions:

- Select boom, connects the joysticks to this boom. Light is on when boom is selected.
- Rod handling activated, the light intensity is low if rod handling functions for this boom is activated but not connected to the joysticks. Light intensity is high if connected to the joysticks.
- Bolting axis to end position, if light is off the bolting axis is pressurised so that it's in the normal position. If light is on it's possible to move the axis with the joystick.
- Water state, light is on if enough water, light is off if not. It's blinking if the water guard is turned off.

Right row of buttons have the following functions:

- Collaring speed, can be adjusted in steps of 3% from 0 to 100%.
- Drilling activated, the light intensity is low if drilling functions for this boom is activated but not connected to the joysticks. Light intensity is high if connected to the joysticks.
- Air on and off, light is on when air is on.
- Water is off, on or in auto. The button is used to step through the three different states. Rapid blinking is water valve manually set to open, slow blinking is water valve manually closed. Light on means that the water flow is controlled by the system and the valve is open, if the light is off the water flow is controlled by the system and the valve is closed.

### 1.6.2 Drill stick



The drill stick works as follow when drilling is activated:

- ↑ 10-90 % = Collaring
- ↑ 90-100 % = Drilling
- ↓ 10-90 % = Stop
- ↓ 90-100 % = Return

If one want to change from drilling to collaring one must hold the drill stick a little forward for half a second. Same with stop, the on has to hold the drill stick a little backward for half a second.

If drifter is in state stop and the drill stick is moved fully forward the state will become collaring anyway. To get drilling state the drill stick has to be moved forward twice.

When drilling is not activated the drifter can be moved by moving the drill stick forward and backward. The speed is proportional to the position of the drill stick.

