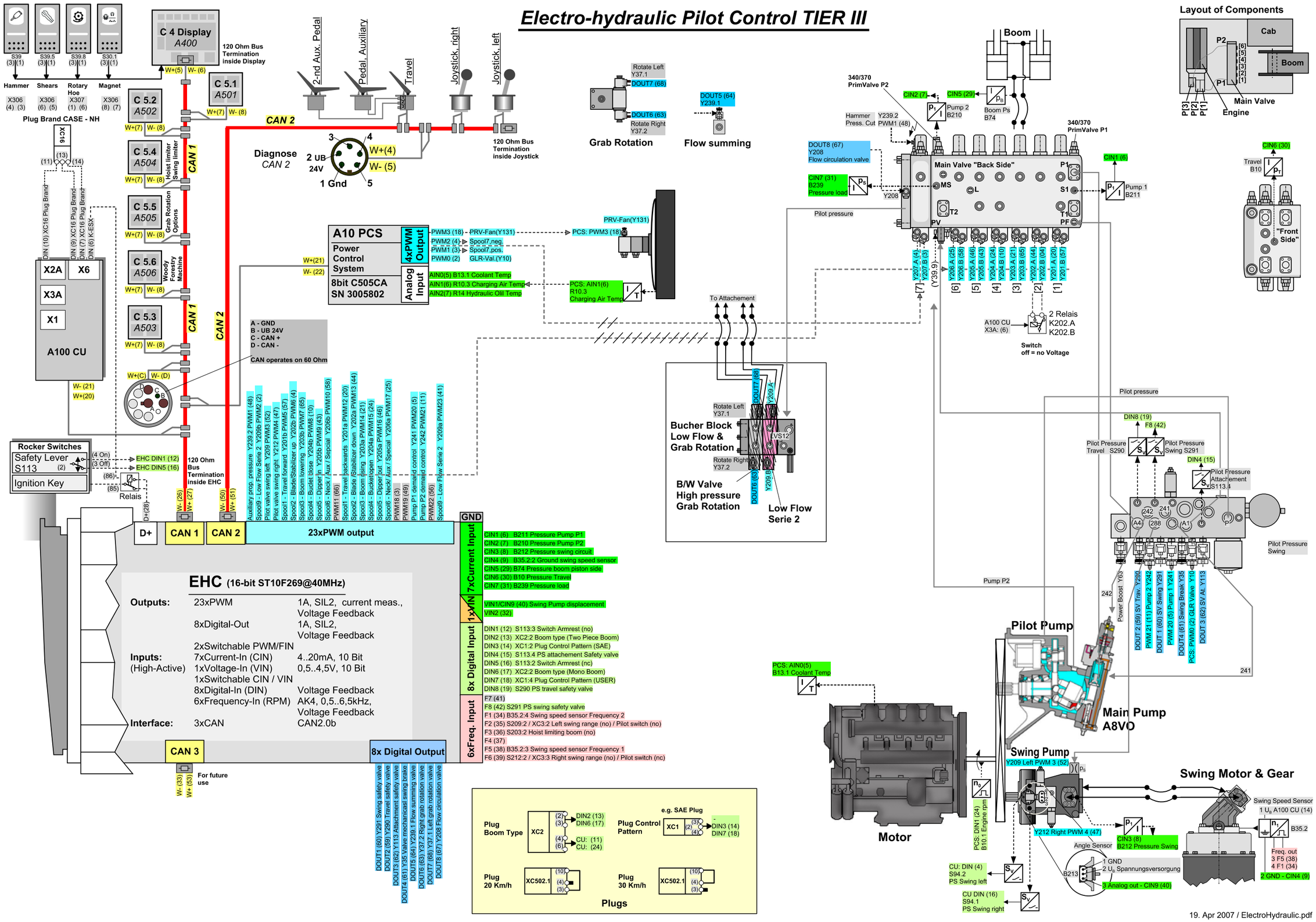
Electro-hydraulic Pilot Control TIER III



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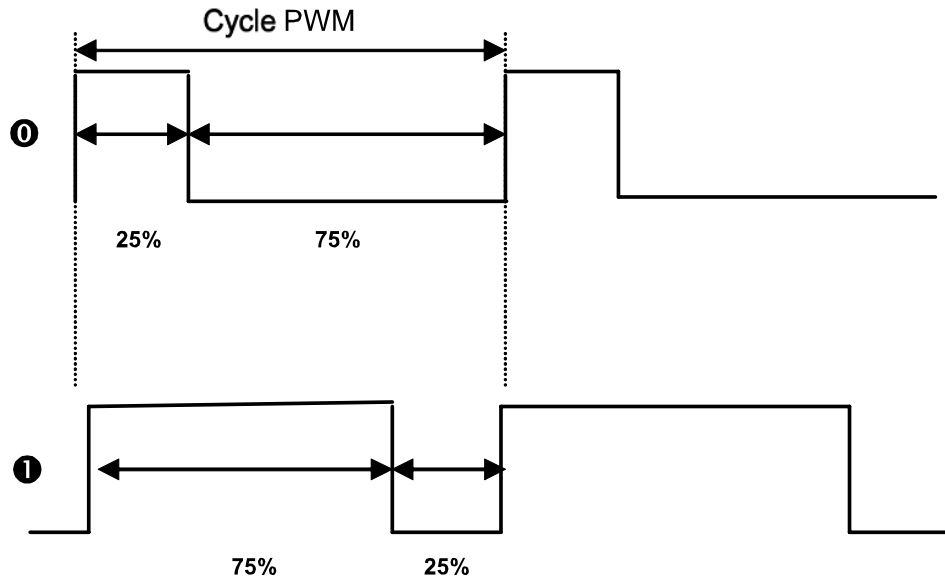
21	PWM output 14, (1 A)_	110 Hz	Spool 3 (neg. Top) (Boom)	Y 203.A
24	PWM output 15, (1 A)_	110 Hz	Spool 4 (neg. Top) (Bucket)	Y 204.A
46	PWM output 16, (1 A)	110 Hz	Spool 5 (neg. Top) (Stick)	Y 205.A
25	PWM output 17, (1 A)_	110 Hz	Spool 6 (neg. Top) (Neck)	Y 206.A
3	PWM output 18, (1 A)	110 Hz	Spool 7 (neg. Top)	
49	PWM output 19, (1 A)	200 Hz	Fan	Y 131
5	PWM output 20, (1 A)_	200 Hz	Pump 1	Y 241
11	PWM output 21, (1 A)_	200 Hz	Pump 2	Y 242
56	PWM output 22, (1 A)	200 Hz	GLR	Y 10
42	PWM output 23, (1 A) (Option: RPM Input 7)	110 Hz	Spool 8	
41	PWM output 24, (1A) (Option; RPM Input 8)	200 Hz		
34	RPM input 1		Engine	B 10.1
35	RPM input 2		Hoist Limiting Boom	
36	RPM input 3		Speed Swing	B 35.2
37	RPM input 4		(2.) Speed Swing	B 35.2
38	RPM input 5		- Left Swing Range Limitation / - Plug Pilot Switch (no)	XC 3
39	RPM input 6		- Right Swing Range Limitation / - Plug Pilot Switch (nc)	XC 3
42	RPM Input 8 (Option: PWM output 24, (1 A))		Switch Swing Pump	S291

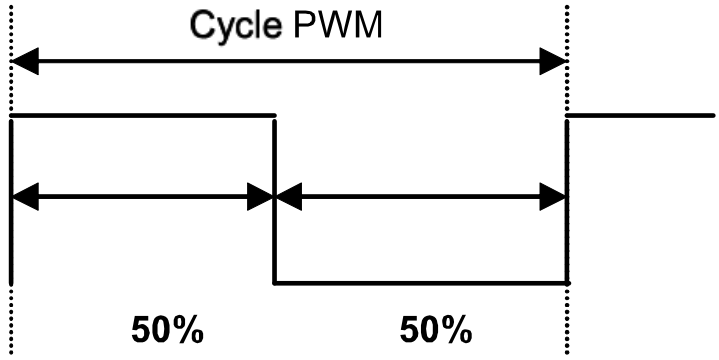
This operation is controlled by Pulse, PWM signal (Pulse Width Modulation)



The CU controls the rotation of the VDO motor to its left-hand stop resulting in minimum engine speed

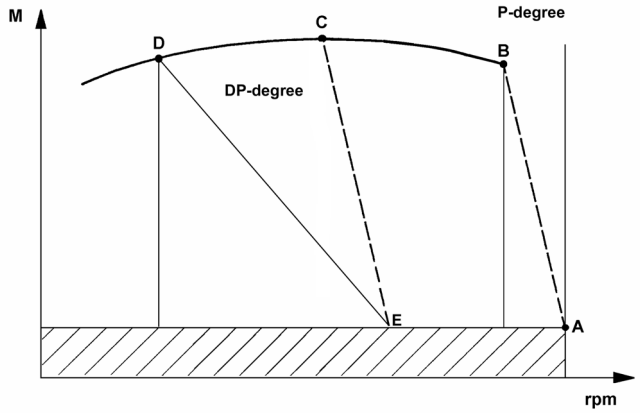
The CU controls the rotation of the VDO motor to its right-hand stop resulting in maximum engine speed.

Attention: When the PWM-signal behaves like shown below,

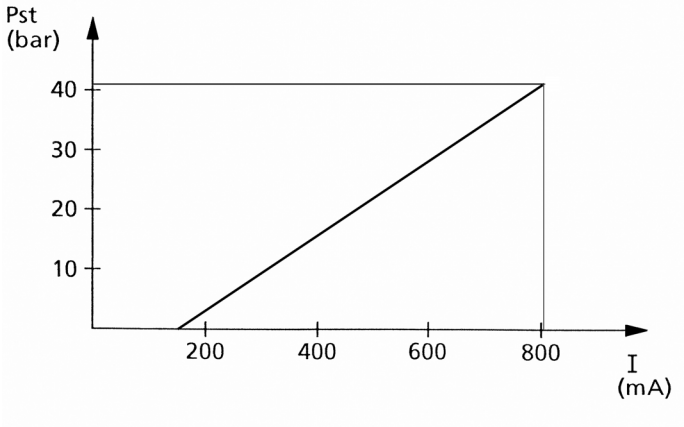


The control of the VDO-motor to rotate clockwise/anti-clockwise is executed by the same value (50%). The VDO-motor stops and gets retained in that position

PCS, closed-loop regulating circuit



Engine curve



Y10 curve

Point A	High-idle speed / engine runs with basic load.
Point B	Nominal speed / engine runs with full load.
Line AB	Engine speed reduction under full load down to nominal speed
Point E	High-idle speeds for smaller power levels; the respective engine speed gets established when a joystick or pedal happens to be operated.
Point C	Engine speed reduction under load by the theoretical P-degree.
Line EC	Engine speed reduction in smaller power level, displaced in parallel to the line AB.
Point D	Engine speed reduction in smaller power level with fully stroked joystick.
Line ED	Real engine speed reduction under load by the P-degree plus DP-degree.
M	Torque curve of the engine

Engine speed variation under load

The torque curve shows the relation between engine speed reduction under load and engine torque.
With basic load condition in **1** the high-idle speed at point **A** gets established.
When the pumps load the engine, then the engine speed is reduced following the reduction curve **AB** down to the nominal speed at point **B,** but at the same time, the engine torque is increased.
When the pump power exceeds the engine power, then the engine speed is continued to be reduced in direction to the point **C**. This further engine speed reduction is picked up by the PCS-box, which in turn, decreases the pump power that far that the engine speed approaches to the nominal speed in point **B.**

Engine specification:

	p-Degré in %	dp-Degré %/100rpm
MH City to MH 8.6	7%	1.0

Code 7017 : M10 – No Voltage Supply at VDO Motor Poti

Priority	Yellow
Conditions	The CU A100 analog input x3a.18 read back the position of the VDO motor M10. If the value<30 (adu steps) then the error 7017 will be active. If the value of this signal>=30 (adu steps) then an active error 7017 will be erased.
Reason	broken wire VDO motor M10 poti supply (connected to CU A100 x3a.17) VDO motor M10 poti defect
Remark	Check Code 7016

Code 7019 : Hammer Return Line Not Relieved Y39.9 + S39.9

Priority	Yellow
Conditions	The following special conditions should be in mind: - The machine is configurated for hammer attachment. - The machine is configurated for shears or rotary hoe attachment. - The hammer attachment is active. - The woody and C4 A400 special attachment are not active. The CU A100 digital input x6.13 (low active) checks the hammer return line pressure switch S39.9 voltage. The engine should be running at least 1 second. If the signal high (24V) for a time>1.3 seconds then the error 7019 will be active. If the signal low (0V) for a time>1.3 second then an active error 7019 will be erased. The error 7019 will be also erased if one or more of the upper conditions are not more full filled.
Reason	hammer return line pressure to high wring of hammer return line pressure switch wrong hammer return line pressure switch S39.9 defect valve Y39.9 defect wiring to valve Y39.9 defect

Code 7021 : Battery Charge Control of Alternator G1 defect in Status Engine Running

Priority	Yellow
Conditions	The CU A100 digital input x3a.24 (low active) checks on alternator G1 the D+ line voltage. The engine should be running at least 1 second. If the signal low (0V) for a time>1 second then the error 7021 will be active. If the signal high (24V) for a time>1 second then an active error 7021 will be erased.
Reason	wiring to alternator G1 broken alternator G1 defect engine is not running but a pick-up B10.1 signal is available engine is not running but the PCS A10 sends a rpm value PCS A10 is not running. CAN wiring of PCS A10 is broken CAN wiring of CU A100 is broken
Remark	Check code 7010 with engine off.

Error Codes of Electro-Hydraulic Controller (TIER 3 - Rev. 3.02)

Error	Priority	On C4	Detect. condition	Device	Name	Error Description
Safety related system diagnostic faults						
9011	white	no	---	EHC Hardware Diagnostic	A7.3	Checksum fault
9012	white	no	---			Failure at shutdown procedure
9013	white	no	---			Defect SPI-Communication
9014	white	no	---			SPI-Bus busy
9015	white	no	---			Checksum fault during initialization system diagnostic
9016	white	no	---			Validation fault during initialization system diagnostic
9017	white	no	---			Reset by User Watch Dog
9018	white	no	---			Reset by System Watch Dog
9019	white	no	---			Hardware failure
9020	white	no	---			Checksum fault while reading error memory
9021	white	no	---			Failure while reading error memory
9022	white	no	---			Value not in range
9023	white	no	---			Defect power supply at OPV and MUX
9024	yellow	no	---			Temperature out of allowed range.
9025	white	no	---			Processor configuration failure by hardware
9026	white	no	---			Defect MUX or AD converter
9027	white	no	---			Voltage threshold failure at inputs
9028	red	no	---			Virtual ground failure
9029	white	no	---			Defect power supply at Watchdog module
9030	white	no	---			Virtual ground failure on BTS
9031	red	no	---			Relay defect
9032	red	no	---			Watchdog module cannot switch off relay
9033	red	no	---			Defect watchdog module
9034	white	no	---			CPU defect
9035	white	no	---			Flag setting not possible
9036	white	no	---			Flag query not possible
9037	white	no	---			Arithmetic logic unit defect
9038	white	no	---			Multiplicator defect
9039	white	no	---			Failure during CPU test
9040	white	no	---			external RAM or ROM defect
9041	white	no	---			Shadow Memory Module defect
9042	yellow	no	---			Total current measurement failure startup
9043	yellow	no	---			Cyclic total current measurement failure
9044	white	no	---			Internal RAM startup defect
9045	white	no	---			Internal RAM cyclic check defect
9046	white	no	---			Ignition status defect
9047	white	no	---			Cyclic diagnostic failure
9048	white	no	---			Other diagnostic failure
9049	white	no	---			Query of hardware type not possible
9050	yellow	yes	---			Safety relais of PWM outputs switched off.
Common faults						
9053	yellow	yes	---	EHC Memory Access	A7.3 Parameter	Input of Manufacturing Code not yet complete.

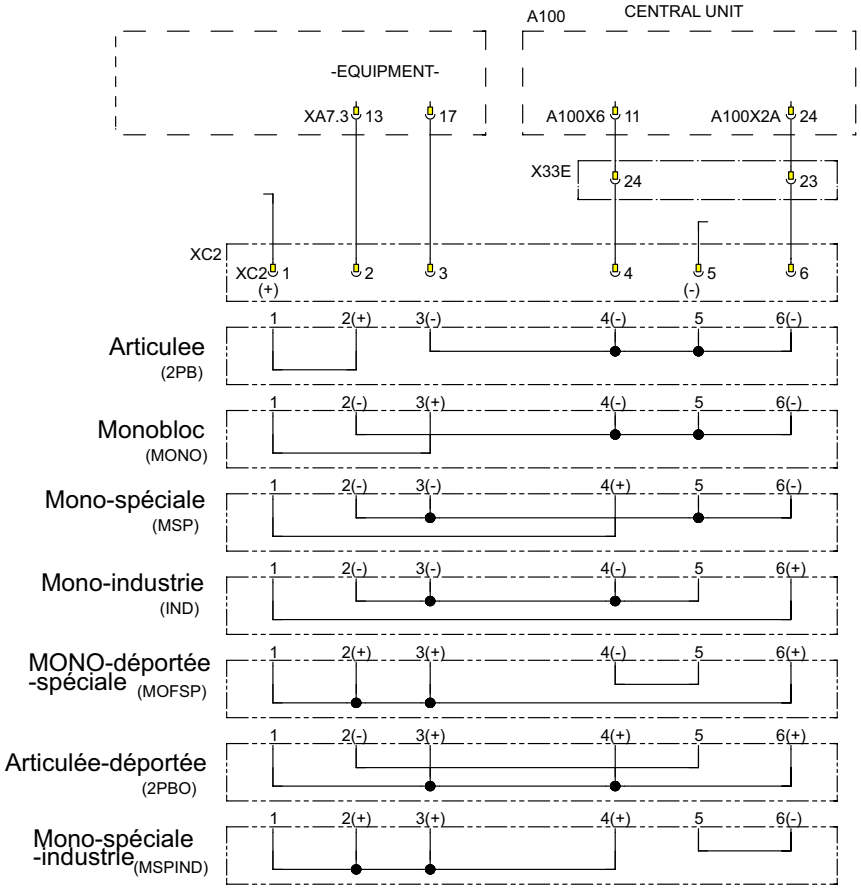
9628	yellow	no	Engine ON	Pressure Sensor Pump P2	B210	Open load at pressure sensor pump P2
9629	yellow	no	---			Short circuit to supply at pressure sensor pump P2
Attachment sensors						
9651	yellow	yes	---	Pressure Sensor Boom PS	B74	Open load at pressure sensor boom piston side
9652	yellow	yes	---			Short circuit to supply at pressure sensor boom piston side
9653	yellow	no	Engine ON	Load Pressure Sensor	B239	Open load at load pressure sensor
9654	yellow	no				Short circuit to supply at load pressure sensor
9655	yellow	yes	Engine ON	Pressure Sensor Travel	B10	Open load at pressure sensor travel function
9656	yellow	yes	---			Short circuit to supply at pressure sensor travel function
9674	yellow	yes	Engine ON	Initiator swing range limitation left	S209	Open load at initiator swing range limitation left
9675	yellow	yes	---			Short circuit to supply at initiator swing range limitation left
9676	yellow	yes	---			Initiator swing range limitation left not available
9677	yellow	yes	Engine ON	Initiator swing range limitation right	S212	Open load at initiator swing range limitation right
9678	yellow	yes	---			Short circuit to supply at initiator swing range limitation right
9679	yellow	yes	---			Initiator swing range limitation right not available
9681	yellow	yes	Engine ON	Initiator Hoist Limiting Boom	S203	Open load at initiator hoist limiting boom
9682	yellow	yes	---			Short circuit to supply at initiator hoist limiting boom
9683	yellow	yes	---			Initiator hoist limiting boom not available
9684	yellow	yes	Engine ON	Initiator Hoist Limiting Positioning	S206	Open load at initiator hoist limiting positioning
9685	yellow	yes	---			Short circuit to supply at initiator hoist limiting positioning
9686	yellow	yes	---			Initiator hoist limiting positioning not available
9687	yellow	yes	Engine ON	Initiator Hoist Limiting Dipper	S205	Open load at initiator hoist limiting dipper
9688	yellow	yes	---			Short circuit to supply at initiator hoist limiting dipper
9689	yellow	yes	---			Initiator hoist limiting dipper not available
Swing system						
9710	yellow	yes	Valve OFF	Left Swing Pilot Valve	Y209	Stucked left swing pilot valve or S94.1/S94.2 not connected or improperly connected
9711	yellow	no	Engine ON or Sol.Cali.			Open load at left swing pilot valve
9712	yellow	no	---			Short circuit to ground at left swing pilot valve
9713	yellow	yes	---			Short circuit to supply at left swing pilot valve
9714	yellow	no	---			Control failure at left swing pilot valve
9715	yellow	yes	Engine ON Valve ON	Defect left swing pilot valve		
9716	yellow	no	Valve OFF			Deviation of current at left swing pilot valve
9720	yellow	yes	Valve OFF	Right Swing Pilot Valve	Y212	Stucked right swing pilot valve or S94.1/S94.2 not connected or improperly connected

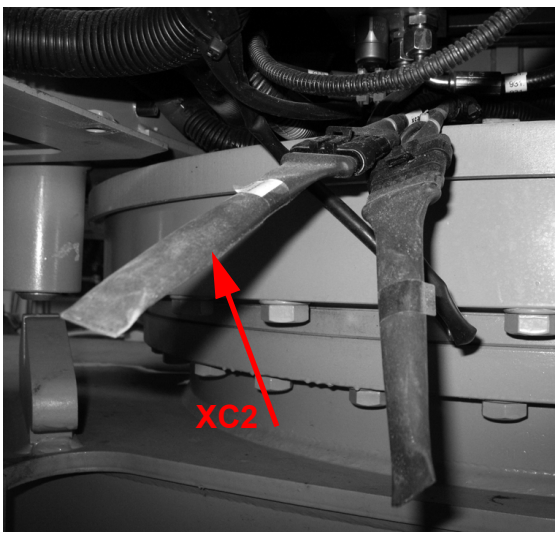
Attachment configuration:

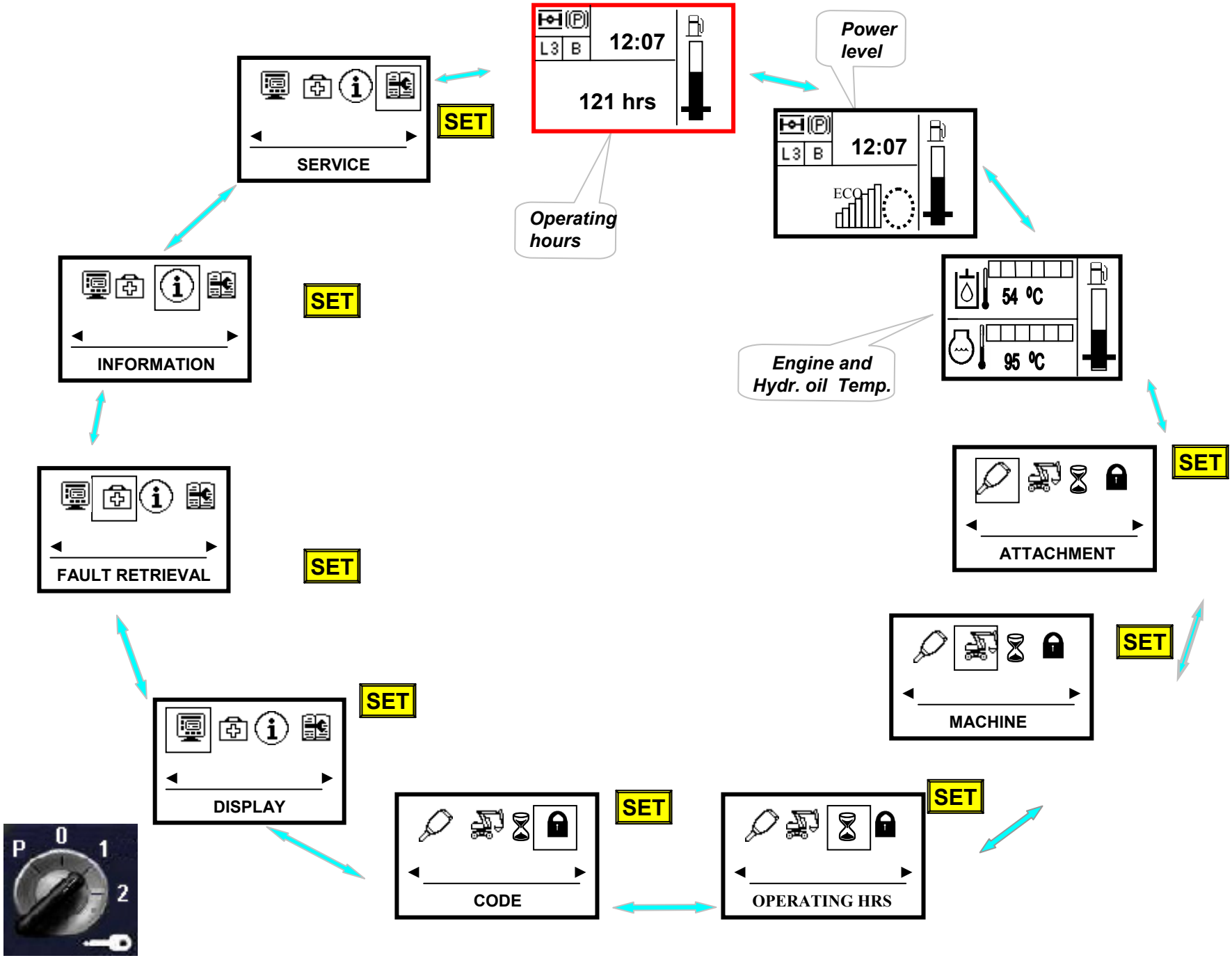
7 Types of Attachments encoded by single plug:

To avoid downloading of attachment-specific parametersets, the different attachment types are encoded by hardware plugs:

Two Piece Boom	PN 6556364
Mono Boom	PN 6556359
Mono Industry	PN 6556361 (e.g. rehandling attachment)
Mono Industry Special	PN 6556390 (e.g. rehandling attachment w. magnet device)
Mono Offset Special	PN 6556362 (offset-boom)
Two Piece Boom Offset	PN 6556363
Mono Special	PN 6556360 (special machines with monoboom and special function in 6th spool, e.g. Woody)

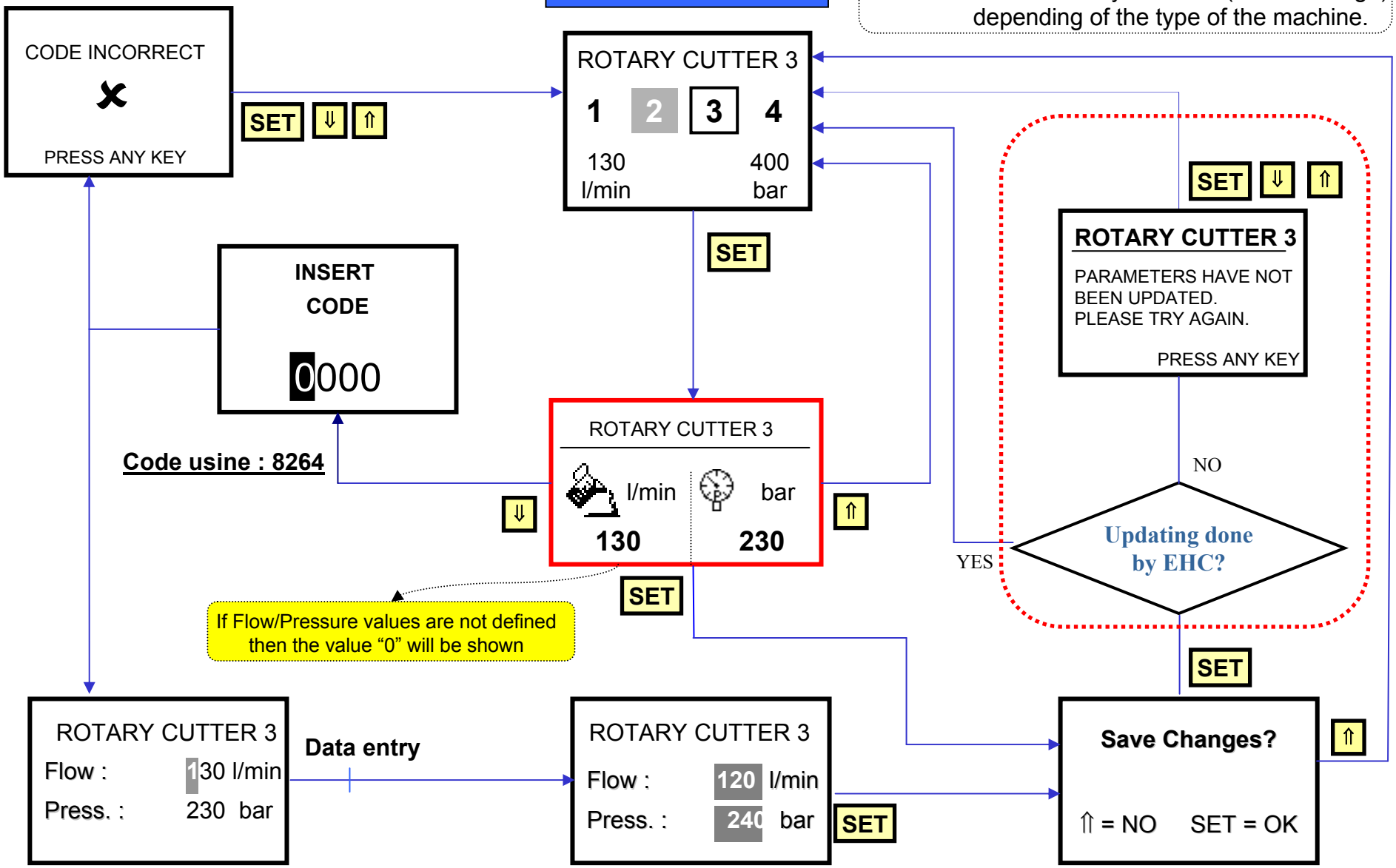




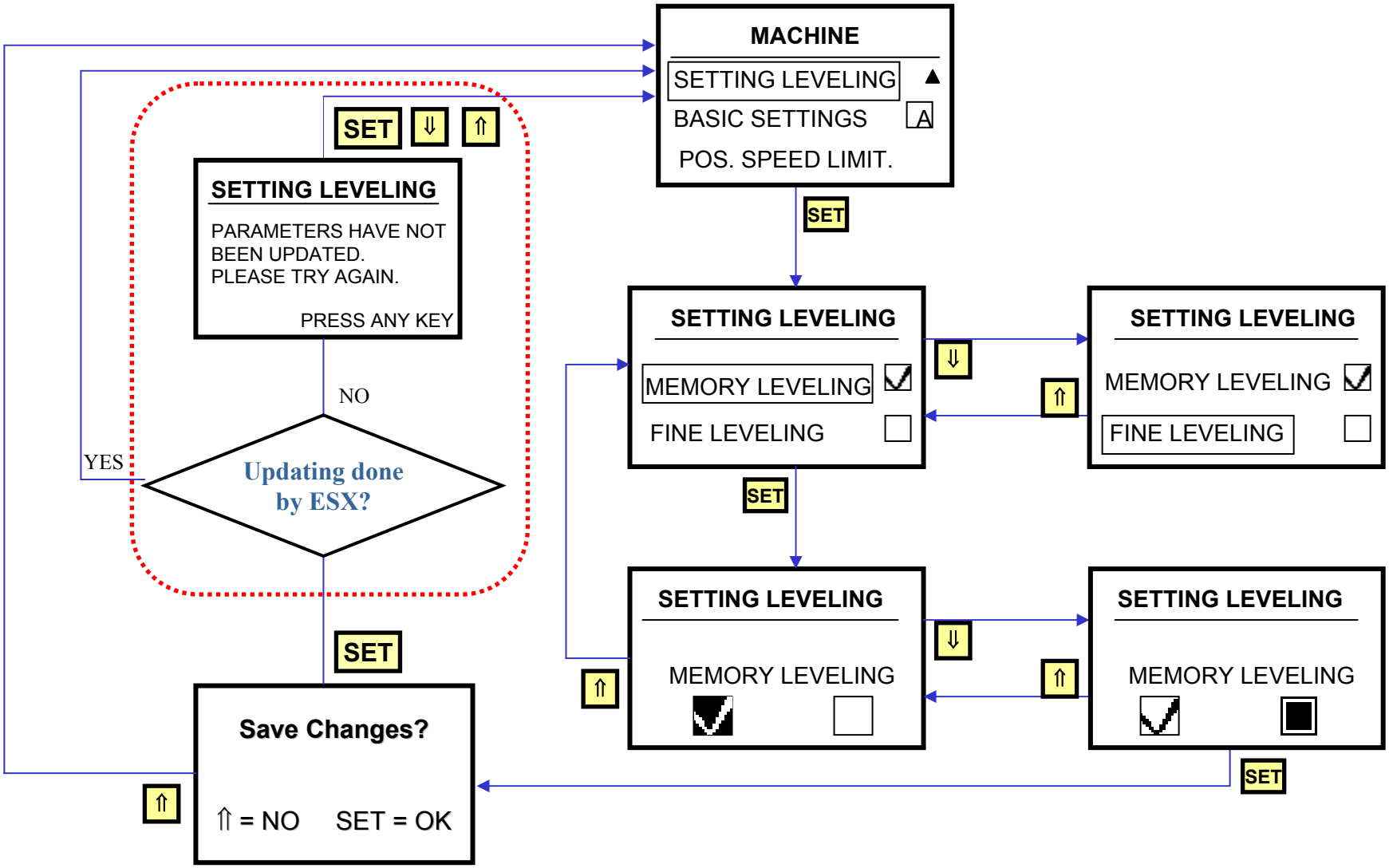

L3 B
12:07
121 hrs
Operating hours
Power level
ECO
54 °C
95 °C
Engine and Hydr. oil Temp.
SET
SERVICE
INFORMATION
FAULT RETRIEVAL
DISPLAY
CODE
OPERATING HRS
ATTACHMENT
MACHINE
P
0
1
2

Rotary Cutter

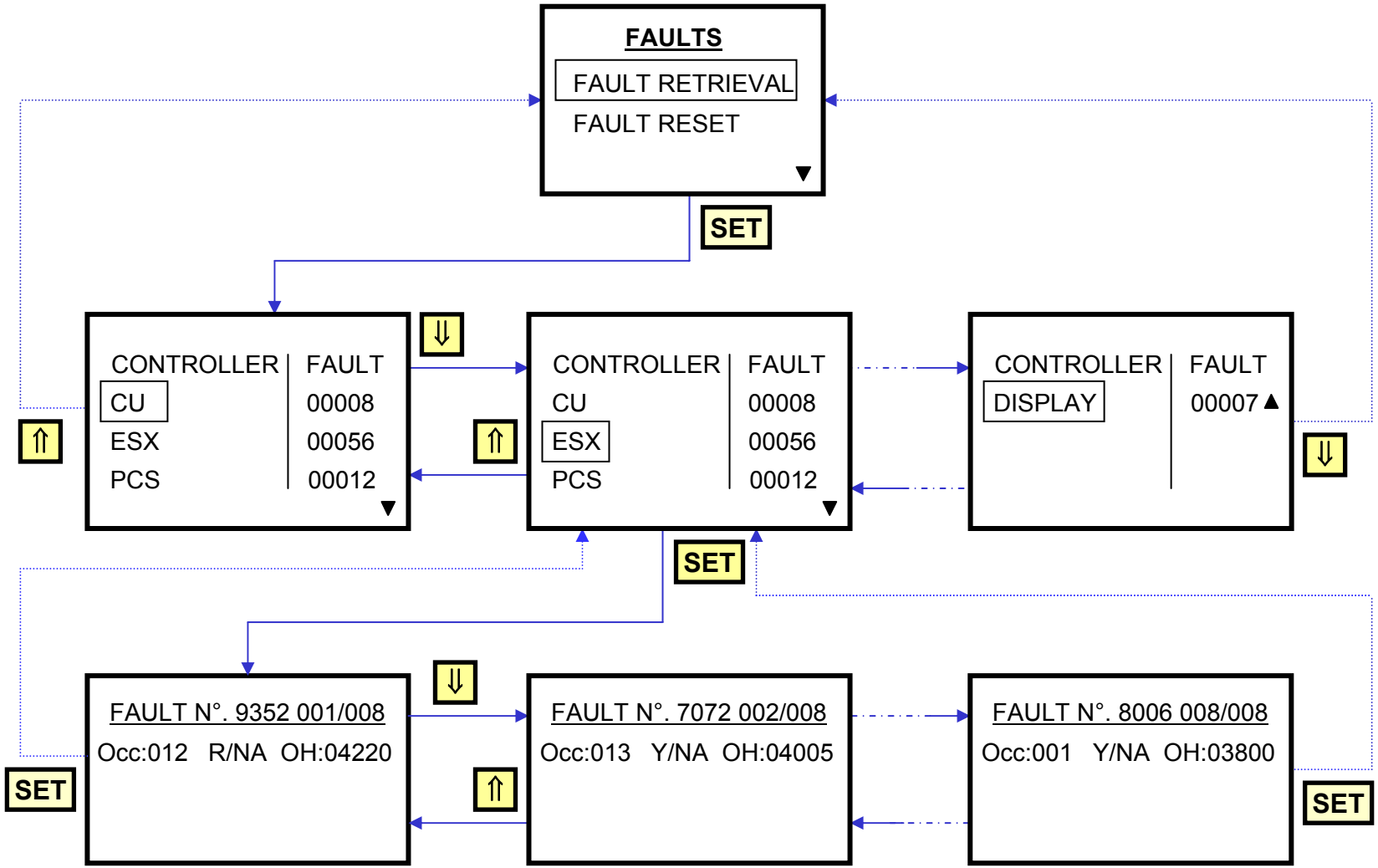
(*) **IMP.** : 0/MAX. Flow and Pressure values are defined by the EHC (P2P message) depending of the type of the machine.



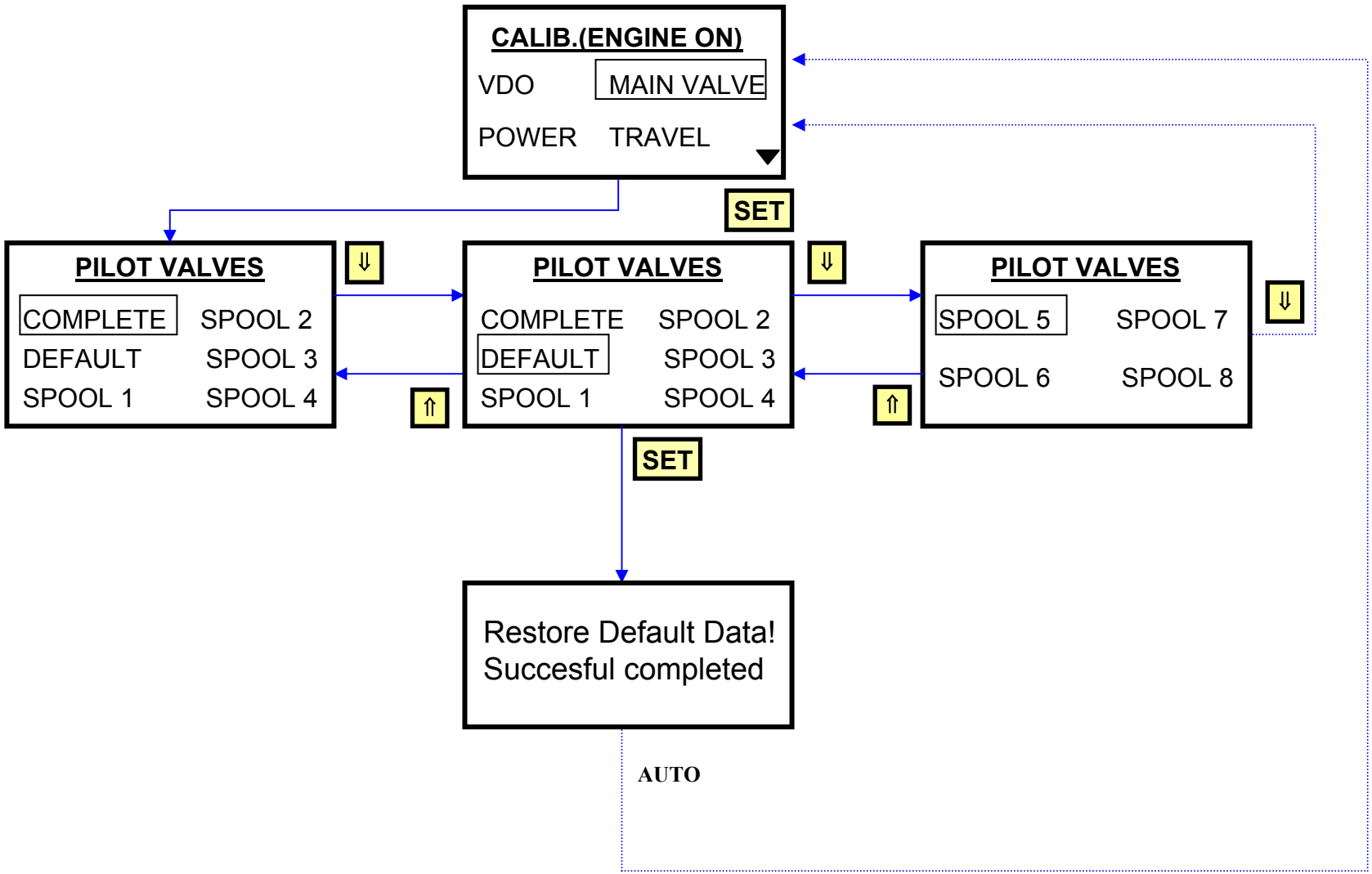
Setting Leveling



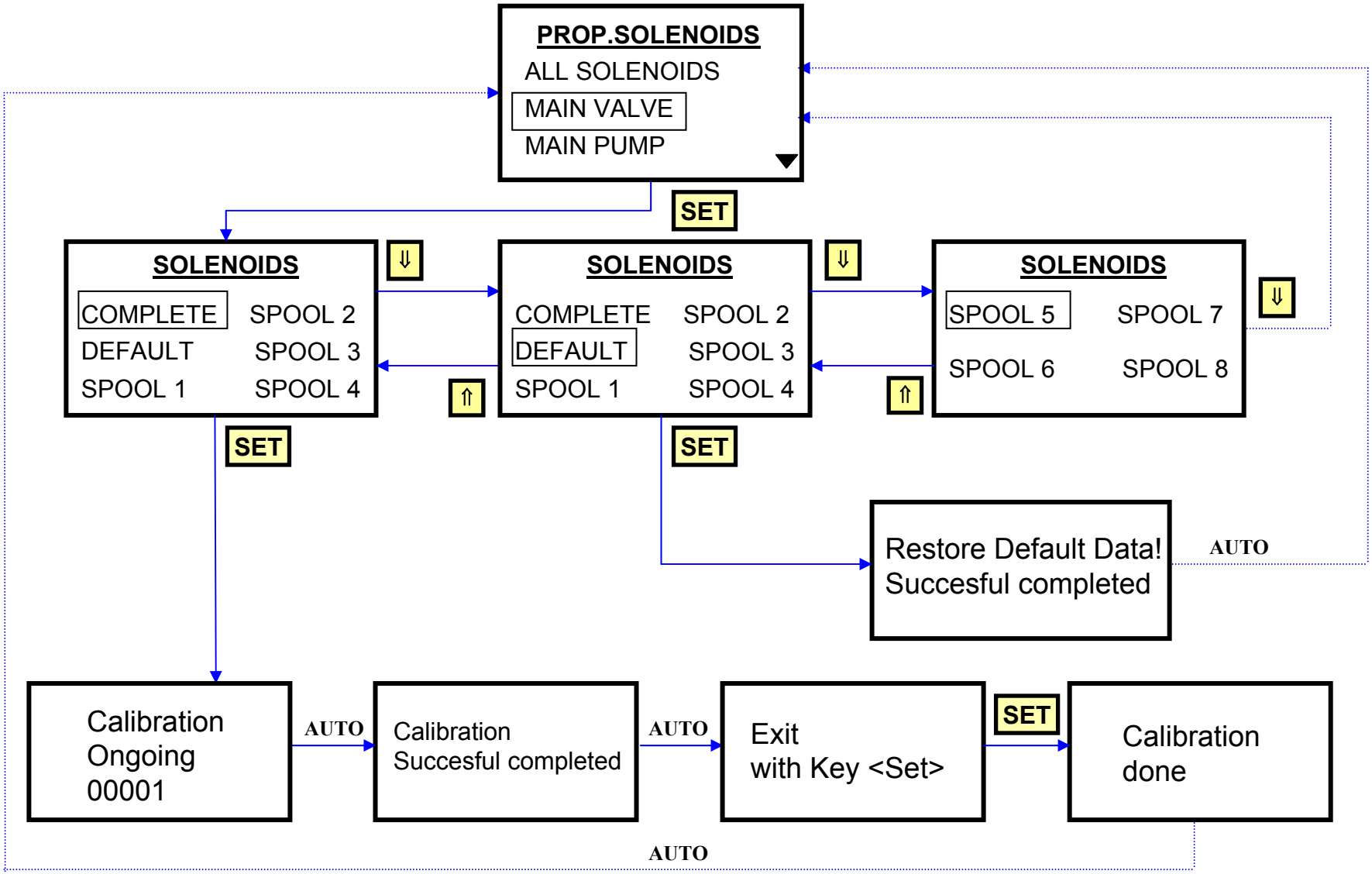
Display, Fault Retrieval



Calibration (Engine ON)
- MAIN VALVE (DEFAULT) -

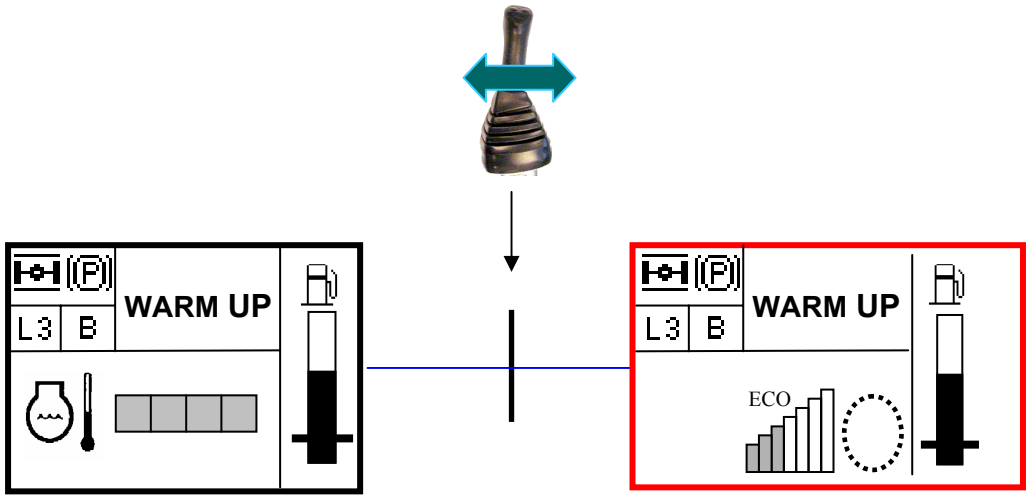


Calibration (Engine OFF)
- Main Valve-

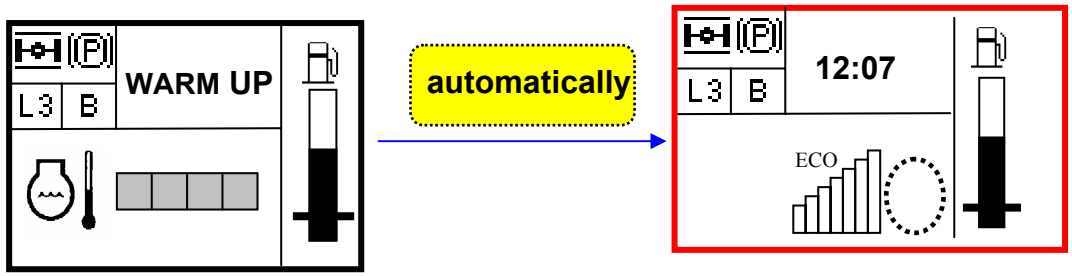


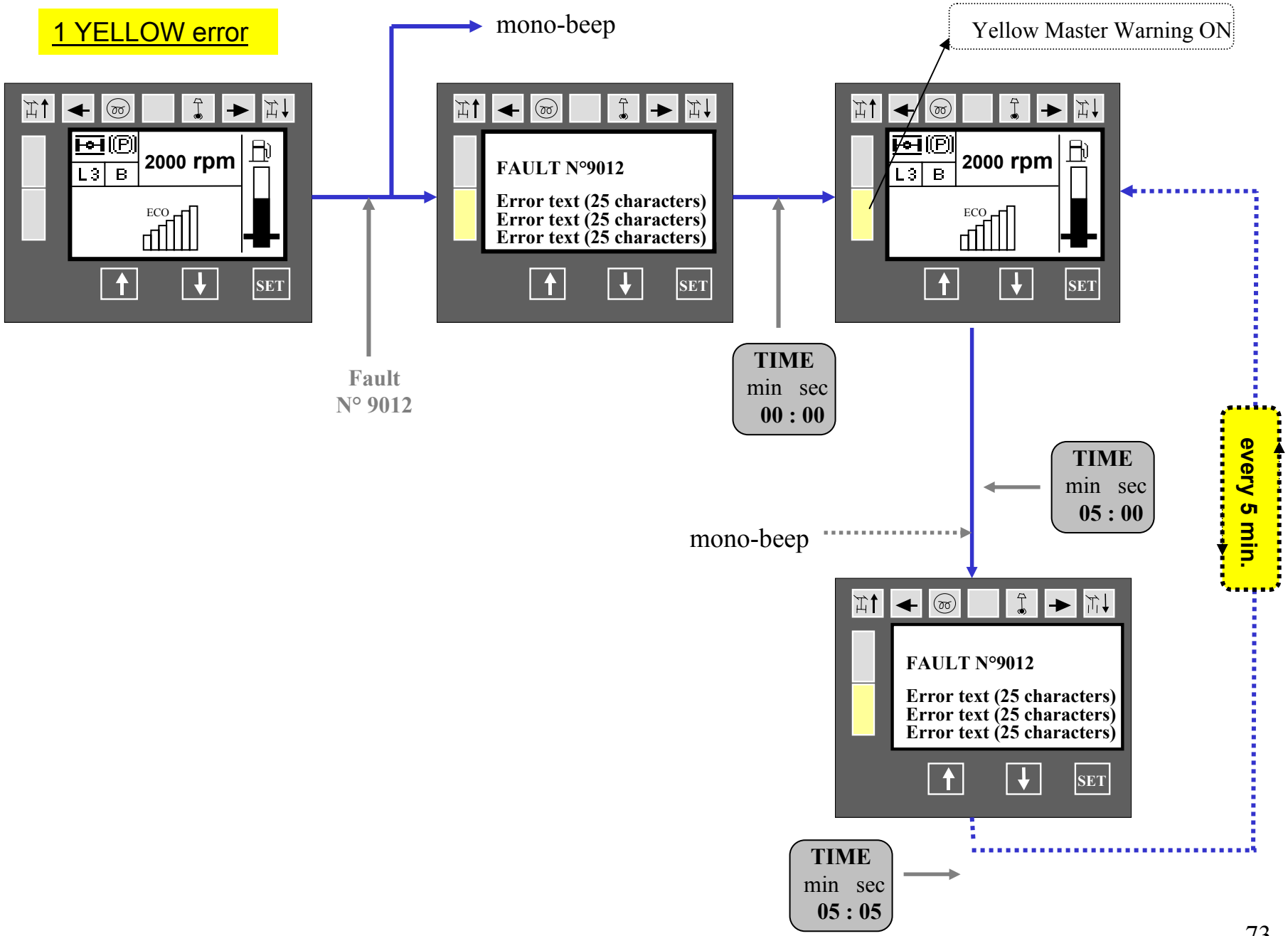
Warm up

If one joystick or the throttle are pressed, the display will automatically switch to a WORKING mode screen which will display the power level and the text “WARM UP” on the top of the screen.



End of WARM UP :




1 YELLOW error
mono-beep
Yellow Master Warning ON
2000 rpm
L3
B
ECO
SET
FAULT N°9012
Error text (25 characters)
Error text (25 characters)
Error text (25 characters)
Fault
N° 9012
TIME
min sec
00 : 00
TIME
min sec
05 : 00
mono-beep
every 5 min.
TIME
min sec
05 : 05