

HS3

Hardware Operating Instructions

- o Intelligent Control for Hydraulic Ram HBL, ECO, ECOplus, HKL
 - o Real Time Control of all Sensors / Actors
 - o Process Knowledge in Firmware
 - o Data Bus Interface: CAN / Profibus / RS-232
 - o HS3-A RS-232
- Id.-No.: 79-0000-0014-00



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Reserved to change

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1. Revisions

Rev.	Date	Name	Appr.	Remarks
1	24.06.04	Bra		Preview
2	22.07.04	Bra		3.1 Related docs, 8.3.5+8.3.6: correct con no. ACK/REQ on X1/X5
3	08.09.04	Hai		8.3.2 (X2) correct pin out slow UP slow DOWN solenoid
4	17.09.04	Bra	Bra	Generic hw manual

2. General Information

- o The intended application of the device is described in this document and must be observed. Contact manufacturer / supplier for different applications.
- o Installation, configuration and operation of the device must be under supervision of a skilled electrician. National regulations must be observed for:
 - Prevention of accidents
 - Safety and installation of mechanical and electrical systems
 - Electromagnetic compliance
- o Please note the technical data of the device, environmental requirements and requirements for power supply.
- o ESD rules must be complied with when handling the device.
- o The device is to be regarded as a „component,, in terms of EMC regulations. Compliance with EMC regulations must be reached for the machine of which the device is a component. Use appropriate measures for shielding / filtering.
- o The process of development and verification for software and firmware (sw/fw) is carried out with the necessary care and understanding. However, sw/fw can not be guaranteed to be error free. H+L reserves the right to change and correct the affected products at its own judgement.
- o Although the device is operating on 24VDC, there may occur dangerous voltages. Digital outputs of type “DO-PB” may carry positive voltages of up to +100VDC and -50VDC. Cabling and wiring must be carried out to meet local safety regulations.
- o Any output connected to an inductive load (solenoid, relay) will generate negative voltage peaks during switching the output off. Consult H+L if necessary.

3. Summary

This document describes the generic hardware features of the HS3 controller.

The following information is **not** given in this document. See other documents for:

- Software operation, working cycles, data interface
- Hardware connection of hydraulic system (schematic)

3.1 Related Documents

The following documents are valid for all systems with HS3-A RS-232. Please, contact H+L for the application specific documents.

HS3 HW Operating Instructions	79-0000-0014-00 - valid for all systems
HS3 FW Download Instructions	79-0039-0036-20 - valid for all systems

3.2 Terminology

THS	Top Hard Stop - internal end position of cylinder stroke
BHS	Bottom Hard Stop - internal end position of cylinder stroke
TCP	Tool Change Position
TDP	Top Dead Position
BDP	Bottom Dead Position
HBL	hydraulic system: cylinder, manifold, valves
ram	Hydraulic piston, or “hammer”.
LMS	Linear Measuring System - the position sensor to monitor the position of the ram.
CNC	Computer Control for the machine's axis.
PLC	Computer control for the machine's other I/O devices.

3.3 Device Versions

Currently available versions: 79-0000-0014-00 HS3-A RS-232

Consult H+L about firmware availability for various punching systems.

4. Delivery

Delivery contains:

- HS3
- Packaging with ESD protection
- Set of external connectors:
Type = HS3 Connector Kit #1
Id.No.= 79-0041-0013-00
- "Generic Device" info sheet

Delivery of the PCU or HRE does **not** include:

- cables for connecting I/O devices or interfaces.
- This manual or other manuals or additional documentation (OEM version)

5. Maintenance

There are no parts that can be serviced by the customer. Software update is done by download into the PCU's flash memory.

5.1 Firmware Download

H+L supplies a special software running under Windows 98/2000/NT that uses the serial interface (COM1..4) of a PC to download a new software into the HS3's flash memory. For this procedure, a cable is needed to connect the PC's COM interface with the HS3's RS-232.

The procedure for firmware download and the necessary cable is described in document:

HS3 FW Download Instructions 79-0039-0036-20-MANxGB

6. Installation and Setup

Never plug/unplug any connector, when system power is on.

6.1 Configuration

For firmware download, all switches in DIL switch S1 must be ON.

For normal operation, S1 must be set according to the respective software manual.

6.2 External Connections

For details on external connections, please see the respective software manual.

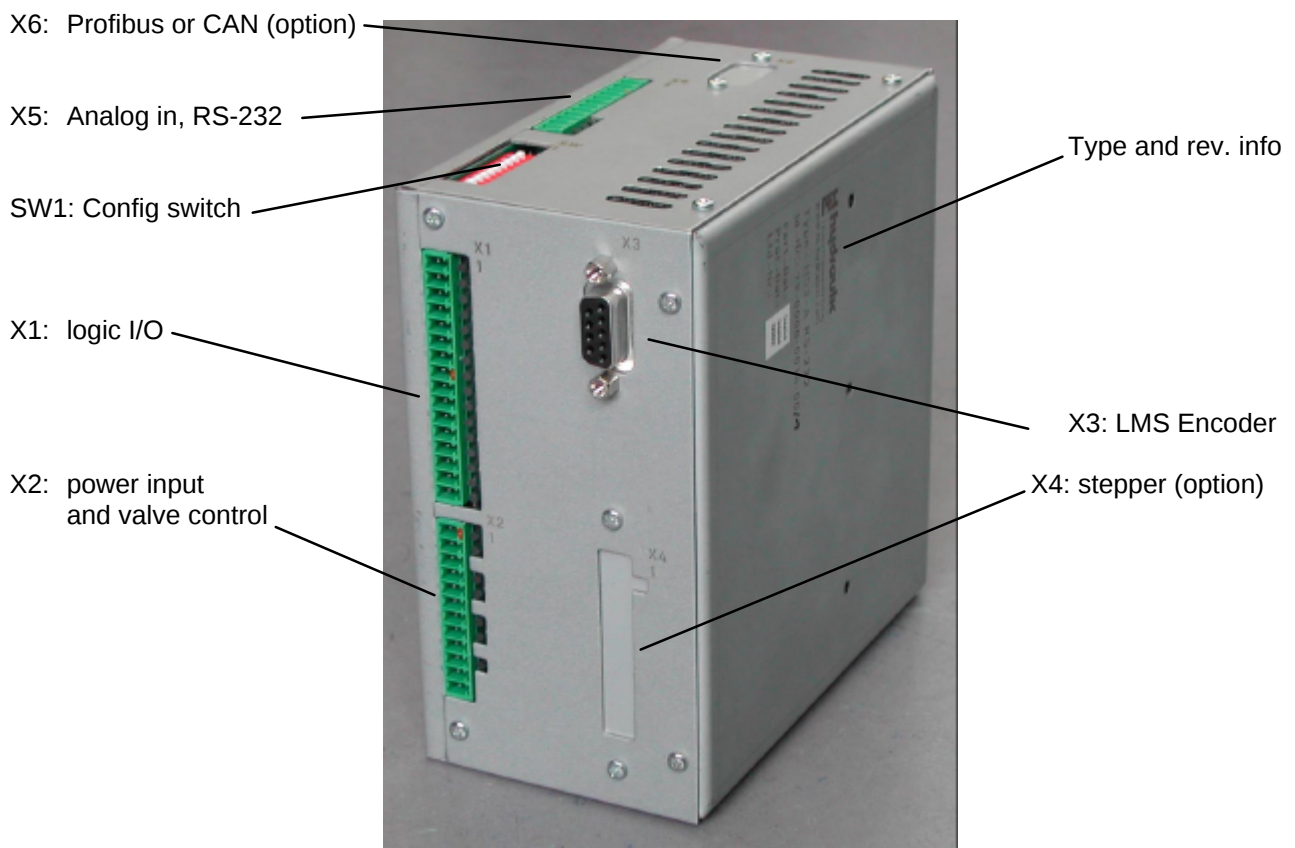
7. Software Operation

For software and protocol definitions, please see "3.1 Related documents". Consult H+L

8. Connectors and Signals

8.1 Overview

The following picture shows the HS3 and its connectors and switches.



8.2 Signal Types

The following table shows the used signal types

Signal Type	Characteristic
V0	Common ground for supply and I/O
V24	24 V supply, reference: GND
V24S	24 V output for a sensor supply, referenced
V5S	24 V output for a sensor supply, referenced
IV0	0 V potential, isolated to V0
IV5	5 V potential, isolated to V0
DI	Digital input, 24V/ 5mA, referenced to V0
DO-L	Digital output, 24V / 0.1A, referenced to V0
DO-P	Digital output, 24V / 1A, referenced to V0
DO-PB	Digital output, 24V / 1A, referenced to V0, with booster capability - dangerous voltage - see general information !
IDOTTL	Digital output, TTL level
IDITTL	Digital input, TTL level
AI1	Analog input, 4-20 mA, referenced to V0
AI2	Analog input, 0..10 V, referenced to V0
P485	RS-485 line, not isolated
I485	RS-485 line, isolated
I232	RS-232 line, isolated
P232	RS-232 line, non isolated
MO	Stepper motor connection, referenced to V0
DATA	Data bus line (RS-232, RS-485, Profibus, CAN, etc.)
CAN1	Can signal line, isolated

8.3 Signal Pin Assignment

8.3.1 X1: Digital I/O

16 Pin Phoenix MiniCOMBICON 3.5mm. Pin 1 is on top. Plug coding on Pin 8.

The pin assignment may be different, depending on the application and the loaded firmware ! Use the information from the software manual of the respective application !

Pin	Type	Name	Function
X1-1	DI	see application manual	Digital input
X1-2	DI	see application manual	Digital input
X1-3	DI	see application manual	Digital input
X1-4	DI	see application manual	Digital input
X1-5	DI	see application manual	Digital input
X1-6	DI	see application manual	Digital input
X1-7	DI	see application manual	Digital input
X1-8	DI	see application manual	Digital input
X1-9	DO-L	see application manual	Digital output, low power
X1-10	DO-L	see application manual	Digital output, low power
X1-11	DO-L	see application manual	Digital output, low power
X1-12	DO-L	see application manual	Digital output, low power
X1-13	DO-L	see application manual	Digital output, low power
X1-14	DO-L	see application manual	Digital output, low power

X1-15	DO-L	see application manual	Digital output, low power
X1-16	DO-L	see application manual	Digital output, low power

8.3.2 X2: Digital Output and Power

12 Pin Phoenix MiniCOMBICON 3.5mm. Pin 1 is on top. Plug coding on Pin 1.

The pin assignment may be different, depending on the application and the loaded firmware ! Use the information from the software manual of the respective application !

Pin	Type	Name	Function
X2-1	DO-P	see application manual	Digital output, high power
X2-2	DO-P	see application manual	Digital output, high power
X2-3	V0	0V	Valve: GND return for connected valves
X2-4	DO-PB	see application manual	Digital output, high power with boosting dangerous voltage - see general information !
X2-5	DO-PB	see application manual	Digital output, high power with boosting dangerous voltage - see general information !
X2-6	V0	0V	Valve: GND return for connected valves
X2-7	DO-PB	see application manual	Digital output, high power with boosting dangerous voltage - see general information !
X2-8	DO-PB	see application manual	Digital output, high power with boosting dangerous voltage - see general information !
X2-9	V0	0V	Valve: GND return for connected valves
X2-10	V24	POWER-24V	Power supply 24V
X2-11	V0	POWER-0V	Power supply GND
X2-12	PE	PE	protective earth

8.3.3 X3: Encoder Input

9 Pin D-Sub female.

Pin	Type	Name	Function
X3-1	IDITTL	ENC-A+	Encoder line A: positive
X3-2	IDITTL	ENC-B+	Encoder line B: positive
X3-3	IDITTL	ENC-Z+	Optional Input
X3-4	V5S	ENC-5V	Encoder supply, 5V
X3-5	V24S	ENC-24V	Encoder supply, 24V
X3-6	IDITTL	ENC-A-	Encoder line A: negative
X3-7	IDITTL	ENC-B-	Encoder line B: negative
X3-8	IDITTL	ENC-Z-	Optional Input
X3-9	V0	0V	Common GND

8.3.4 X4: Stepper Motor

Reserved option.

8.3.5 X6: Profibus or CAN

Depending on the device version, X6 will carry the profibus, the CAN bus. If none of these interfaces is equipped, X6 may be not present.

8.3.5.1 X6 as CAN Bus

SUB-D 9 female.

Pin	Type	Name	Function
X6-1	-	-	-
X6-2	CAN1	CAN_L	CAN bus
X6-3	IV0	ENABLE	0V for CAN
X6-4	-	-	-
X6-5	-	-	-
X6-6	-	-	-
X6-7	CAN1	CAN_H	CAN bus
X6-8	-	-	-
X6-9	-	-	-

8.3.5.2 X6 as Profibus

SUB-D 9 female.

Pin	Type	Name	Function
X6-1	-	-	-
X6-2	-	-	-
X6-3	I485	PROF-B	Profibus B line
X6-4	IDOTTL	PB-DIR	Profibus direction
X6-5	IV0	PB-GND	Profibus isolated GND
X6-6	IV5	PB-5V	Profibus isolated 5V
X6-7	-	-	-
X6-8	I485	PROF-A	Profibus A line
X6-9	-	-	-

8.3.6 X5: Analog, Digital, RS-232

12 Pin Phoenix MiniCOMBICON 3.5mm. Pin 1 is on rear. Plug coding on Pin 3.

Pin	Type	Name	Function
X5-1	V0	COM0-ND	RS-232 port gnd
X5-2	P232	COM0-TXD	RS-232 port TX line
X5-3	P232	COM0-RXD	RS-232 port R line
X5-4	V0	AGND	Analog ground
X5-5	AI2	AIN0	Analog Input
X5-6	V0	AVREF-10V	Analog reference voltage
X5-7	V0	AGND	Analog ground
X5-8	AI2	AIN1	Analog Input
X5-9	V0	AVREF-10V	Analog reference voltage
X5-10	DI	REQ	REQ, for Fanuc RS-232 protocol only
X5-11	DI	-	-
X5-12	DI	-	-

9. Specifications

9.1 Technical Data

Name	HS3-A RS-232		
Ident-No.	79-0000-0014-00		
Weight	net: 0.8 kg, with plugs set and packaging: approx 0.9 kg		
Size	W*H*D = 73 * 135 * 140 mm ³		
Mounting	Mounts on 35 mm DIN rail		
Space requirement	20 mm free space on each side. Top / bottom: 60 mm from corpus		
Space requirement, with forced air min 20 m ³ /h	No extra space required.		
Environment: storage	Temp.: -10°C .. 70°C, not condensing Humidity:: 5..95 %, not condensing		
Environment: operation	Humidity:: 5..95 %, not condensing Temp.: 5°C .. 45°C, passive convection 5°C .. 55°C, forced airflow: min. 20m ³ /h		
Digital Inputs	24V/0.01A Low: 0..5 V High: 15.. Vcc		
Digital Outputs	DO-P 24V/1A short circuit protected max. 1 s DO-PB 24V/100V/1A not short circuit protected DO-L 24V/0.1A short circuit protected max. 1 s		
Analog Input	reserved		
Analog Output	reserved		
Encoder Input	for H+L LMS1, LMS2		
RS-232	max. 19200 baud, non-isolated, H+L protocol		
Power consumption	Max. : 120 VA		
Power Supply	24 V: 20..28 VDC including max. 1Vss ripple, 5 A		
Fuse	External: 6.3 A slow for 24V		
Connector types and mating external connectors	X1: 16 Pin Phoneix MiniCOMBICON: MC1,5/16-G-3,5 mating plug: MC1,5/16-ST-3,5 X2: 12 Pin Phoneix MiniCOMBICON: MC1,5/12-G-3,5 mating plug: MC1,5/12-ST-3,5 X3: Sub-D 9 Pin female mating plug: Sub-D 9 Pin male X2: 12 Pin Phoneix MiniCOMBICON: MC1,5/12-G-3,5 mating plug: MC1,5/12-ST-3,5		

9.2 Dimensions

Front view:

Width approx. 73 mm

Height approx. 135 mm

Top view:

Depth approx 140 mm



Back view:

Clips for 35 mm DIN rail mounting

