

# MHDC SERIES

MINI HALL EFFECT DIGITAL  
CONTROL JOYSTICK



**MHDC PILOT CONTROL**

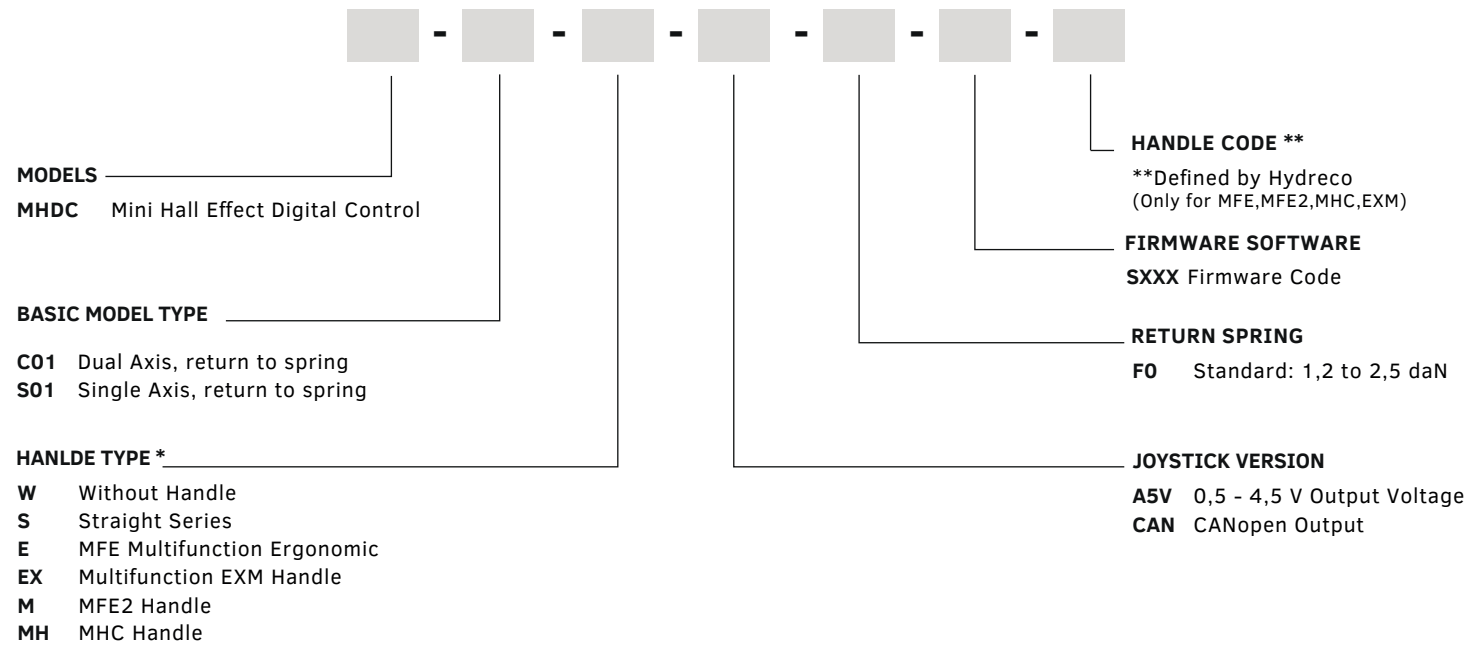
The MHDC Joystick combines the extensive Hydreco experience in Hydraulics and the latest technologies based on SMD Hall effect sensors and microcontroller's architecture. The product has a new design meant to provide a comfortable and fine control of mobile and industrial applications. It's a single lever with single / dual axis control, supported by an extensive range of handle options. MHDC versatility and flexibility of use, satisfies the most demanding customer's requirements, offering the most used output interfaces CANopen and 0-5 Volt. Our engineers can offer specialistic support to optimize the solution which suits each application.

**FEATURES**

- Compact, lightweight PA66 body with glass fiber.
- Advanced embedded electronics and reliable mechanical structure.
- Suitable for armrest and installing requirements with narrow spaces.
- Wide range of electrical options in multifunctional ergonomic handles.
- Sealed electronics
- Available in CANopen and 0-5V output versions.
- Software environment available to set the main CANopen communication joystick's parameters.
- MHDC Joystick is compliant with the EMC Directive and the following regulations :  
UNI EN ISO 13766-1:2018 / UNI EN ISO 14982:2009  
EN 61000-6-4:2007+A1:2011 / EN 61000-6-2:2005+AC:2005

**MHDC SERIES - MODEL CODING**

Hydreco Hydraulics reserves the right to update the information and data contained in this catalogue at any time without notice

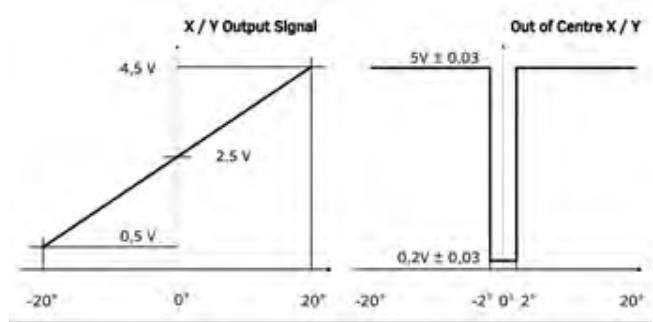


\*See Handles Catalog

**Example:** MINI HALL EFFECT DIGITAL CONTROL JOYSTICK, DUAL AXIS RETURN TO SPRING, MFE HANDLE, ANALOG OUT IN RANGE 0.5V-2.5V-4.5V, F0 STD SPRING, FIRMWARE S0001, HANDLE REFERENCE N. - 03933: MHDC-C01EA5VF0S0001-03933

**0-5V VERSION GENERAL TECHNICAL FEATURES**

Voltage supply:	9-32 VDC
Output voltage range on X/Y Axis:	0,5 ÷ 4,5 V
Tolerance on output signal:	± 0,03 V
Out of central position:	N.2 out 0-5 V@15mA
Mechanical life:	>3 million cycles
Operating temperature:	-40° ÷ 85° C
Sealed electronics	
*Optional ON-OFF power outputs	Up to N.8 ON-OFF 2A @12V/24



**0-5V VERSION WIRING TABLE**

WIRE COLOR	FUNCTION
RED	12 / 24 VBatt
BLACK	Gnd
YELLOW	X Axis
GREY	Y Axis
GREEN	Y Out of Centre
ORANGE	X Out of Centre

**CANopen VERSION GENERAL TECHNICAL FEATURES**

Voltage supply:	9-32 VDC
Proportional Axis:	Up to N.6
Digital input:	ON-OFF N.9 0-5V and N.2 12/24V
CANopen Bit Rate:	125-250-500-1000 kBit/s
Mechanical life:	>3 million cycles
Operating temperature:	-40° ÷ 85° C
Sealed electronics:	
*Optional ON-OFF power outputs	Up to N.8 ON-OFF 2A @12V/24

**CANopen VERSION WIRING TABLE**

WIRE COLOR	FUNCTION
RED	12 / 24 VBatt
BLACK	Gnd
BROWN	CAN_H
BLUE	CAN_L

**CANopen TPDOs CONTENT**

**TX PDO1**

Byte 0, Byte 1	Byte 2, Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Joystick Right/Left Axis 1 (-10000..10000)	Joystick Forward/Backward Axis 2 (-10000..10000)	ON-OFF Pushbuttons  Bit 0 : DIG_9 Bit 1 : DIG_10 Bit 2 : DIG_11	Bit 0 : DIG_1 Bit 1 : DIG_2 Bit 2 : DIG_3 Bit 3 : DIG_4 Bit 4 : DIG_5 Bit 5 : DIG_6 Bit 6 : DIG_7 Bit 7 : DIG_8	Out of center flags  Bit 0 : Axis 1 Bit 1 : Axis2 Bit 2 : Roller 1 Bit 3 : Roller 2 Bit 4 : Roller 3	Don't care
Central =0 Forward : 1 → 10000 Backward : -1 → -10000	Central=0 Right: 1 → 10000 Left: -1 → 10000	Bit 3-7 don't care			

**TX PDO1**

Byte 0, Byte 1	Byte 2, Byte 3	Byte 4, Byte 5	Byte 6, Byte 7
Roller 1 (-10000..10000)	Roller2 (-10000..10000)	Roller2 (-10000..10000)	Roller2 (-10000..10000)
Central =0 Forward : 1 → 10000 Backward : -1 → -10000	Central =0 Forward : 1 → 10000 Backward : -1 → -10000	Central =0 Forward : 1 → 10000 Backward : -1 → -10000	Central =0 Forward : 1 → 10000 Backward : -1 → -10000

CANopen OBJECT DICTIONARY MAIN SUBSET

Communication Profile Area covers index from 1000 to 1FFF

Index	Sub Index	Designation	Type	Default	Description
0x1000	0x00	Device type	U32 ro	0x01070191	DS-401 Joystick profile
0x1010	0x01	Save all parameters	U32 rw	0x00000001	
0x1011	0x01	Restore default parameters	U32 rw	0x00000001	
0x1016	0x00	Consumer heartbeat time	U8 ro	0x08	
	0x01 .. 0x08	Consumer heartbeat time	U32 rw eeprom	0x00000000	Bit 24-32: 0 Bit 16-23: Node ID of monitored node Bit 0.15: Heartbeat time in ms (0 = not used)
0x1017	0x00	Producer heartbeat time	U16 rw eeprom	0x0064	Heartbeat producer time in ms (0 = disable transmission)
0x1018	0x00	Identity	U8 ro	0x04	
	0x01	Vendor-ID	U32 ro	0x0000016A	Diplomatic Vendor ID
	0x02	Product code	U32 ro	0x00230004	MHDC product code
	0x03	Revision number	U32 ro		Hardware revision code
	0x04	Serial number	U32 ro		serial number
0x1400	0x00	RPDO 1 communication parameters	U8 ro	0x02	
	0x01	COB-ID used by RPDO	U32 rw eeprom	0x0200 + Node ID	
	0x02	Transmission type	U8 rw eeprom	0xFE	
0x1600	0x00	RPDO mapping parameter	U8 rw eeprom	0x01	Number of mapped objects (1..8)
	0x01	Mapped object 1	U32 rw eeprom	0x6200108	Mapped to Index 0x6200, Sub 0x01, length 8 bit
0x1800	0x00	TPDO 1 communication parameters	U8 ro	0x06	
	0x01	COB-ID used by TPDO	U32 rw eeprom	0x0180 + Node ID	TPDO 1 Node ID
	0x02	transmission type	U8 rw eeprom	0xFE	0xFE = asynch transmission periodical
	0x03	inhibit time	U16 rw eeprom	0x000A	TPDO inhibit time in ms
	0x04	compatibility entry	U8 rw eeprom	0x00	not used
	0x05	event timer	U16 rw eeprom	0x0064	TPDO send interval in ms
	0x06	SYNC start value	U8 rw eeprom	0x00	
0x1801	0x00	TPDO 2 communication parameters	U8 ro	0x06	
	0x01	COB-ID used by TPDO	U32 rw eeprom	0x0280 + Node ID	TDPO 2 Node ID
	0x02	transmission type	U8 rw eeprom	0xFE	0xFE = asynch transmission periodical
	0x03	inhibit time	U16 rw eeprom	0x000A	TPDO inhibit time in ms
	0x04	compatibility entry	U8 rw eeprom	0x00	not used
	0x05	event timer	U16 rw eeprom	0x0064	TPDO send interval in ms
	0x06	SYNC start value	U8 rw eeprom	0x00	
0x1A00	0x00	TPDO 1 mapping parameters	U8 rw eeprom	0x06	
	0x01	Mapped object 1	U32 rw eeprom	0x64010110	Mapped to Index 0x6401, Sub 0x01, length 16 bit
	0x02	Mapped object 2	U32 rw eeprom	0x64010210	Mapped to Index 0x6401, Sub 0x02, length 16 bit
	0x03	Mapped object 3	U32 rw eeprom	0x60000408	Mapped to Index 0x6000, Sub 0x04, length 8 bit
	0x04	Mapped object 4	U32 rw eeprom	0x60000308	Mapped to Index 0x6000, Sub 0x03, length 8 bit
	0x05	Mapped object 5	U32 rw eeprom	0x60000208	Mapped to Index 0x6000, Sub 0x02, length 8 bit
	0x06	Mapped object 6	U32 rw eeprom	0x60000108	Mapped to Index 0x6000, Sub 0x01, length 8 bit
0x1A01	0x00	TPDO 2 mapping parameters	U8 rw eeprom	0x04	
	0x01	Mapped object 1	U32 rw eeprom	0x64010310	Mapped to Index 0x6401, Sub 0x03, length 16 bit
	0x02	Mapped object 2	U32 rw eeprom	0x64010410	Mapped to Index 0x6401, Sub 0x04, length 16 bit
	0x03	Mapped object 3	U32 rw eeprom	0x64010510	Mapped to Index 0x6401, Sub 0x05, length 16 bit
	0x04	Mapped object 4	U32 rw eeprom	0x64010610	Mapped to Index 0x6401, Sub 0x06, length 16 bit
0x1F80	0x00	NMT Startup	U32 rw eeprom	0x00000008	Bit3: 1 = start node automatically

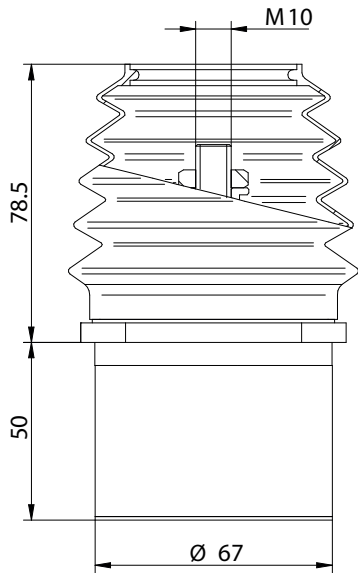
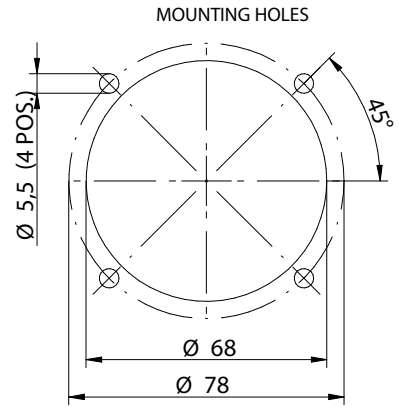
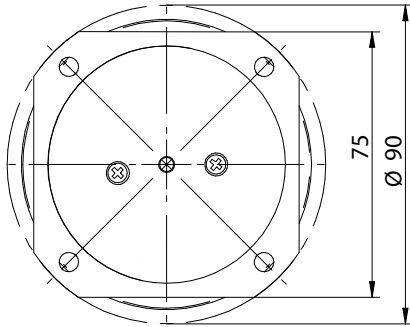
Manufacturer Specific Profile Area covers index from 0x2000 to 0x5FFF

Index	Sub Index	Designation	Type	Default	Description
0x3010	0x00	Baudrate	U16 rw eeporm	0x007D	CanBus Baudrate in kBit/s (10,20,50,100,125,250,800,1000)
0x3011	0x00	Node ID	U8 rw eeprom	0xFF	Actual Node ID (1..127 or 255 for LSS protocoll)
0x3012	0x00	CanTermination	U8 rw eeprom	0x01	Internal CanBus termination: 0 = disable 1 = enabled

Device Specific Profile Area covers index from 0X6000 to 0X6FFF

Index	Sub Index	Designation	Type	Default	Description
0x6000	0x00	Read Input 8 Bit	U8 ro	0x04	
	0x01	Memory Buttons	U8 ro		memory button values (not used)
	0x02	Axis Center Indicator	U8 ro		Bit 0: X Axis out of center Bit 1: Y Axis out of center Bit 2: Roller 1 out of center Bit 3: Roller 2 out of center Bit 4: Roller 3 out of center Bit 5: Roller 4 out of center Bit6,7. Not used
	0x03	Digin 1 to Digin 8	U8 ro		Bit 0: Digin 1 .... Bit 7: Digin 8
	0x04	Digin 9 to Digin 11	U8 ro		Bit 0: Digin 9 Bit 1: Digin 10 Bit 2: Digin 11 Bit3..7: not used
0x6002	0x00	Input polarity 8 Bit	U8 ro	0x04	0 = normal, 1 = inverted
	0x02	Axis Center Indicator	U8 rw eeprom	0x00	Bit 0: X Axis out of center Bit 1: Y Axis out of center Bit 2: Roller 1 out of center Bit 3: Roller 2 out of center Bit 4: Roller 3 out of center Bit 5: Roller 4 out of center Bit6,7. Not used
	0x03	Digin 1 to Digin 8	U8 rw eeprom	0x00	Bit 0: Digin 1 .... Bit 7: Digin 8
	0x04	Digin 9 to Digin 11	U8 rw eeprom	0x00	Bit 0: Digin 9 Bit 1: Digin 10 Bit 2: Digin 11 Bit3..7: not used
0x6200	0x00	Write Output 8 Bit	U8 ro	0x01	
	0x01	Output 1 to Output 8	U8 rw	0x00	Bit 0: Output 1 (0 = off, 1 = on) ... Bit 7: Output 8 (0 = off, 1 = on)
0x6401	0x00	Read Analogue input 16 Bit	U8 ro	0x09	
	0x01	Joystick X direction	I16 ro		Analog Joystick position range +/- 10000 (post scaling off)
	0x02	Joystick Y direction	I16 ro		Analog Joystick position range +/- 10000 (post scaling off)
	0x03	Roller 1	I16 ro		Analog Roller position range +/- 10000 (post scaling off)
	0x04	Roller 2	I16 ro		Analog Roller position range +/- 10000 (post scaling off)
	0x05	Roller 3	I16 ro		Analog Roller position range +/- 10000 (post scaling off)
	0x06	Roller 4	I16 ro		Analog Roller position range +/- 10000 (post scaling off)
	0x07	Vbatt	I16 ro		Battery Voltage in mV range 0..32000
	0x08	V5V	I16 ro		Internal 5V supply Voltage in mV range 0..5500
	0x09	V3V3	I16 ro		Internal 3.3V supply Voltage in mV range 0..3600
0x6460	0x00	Dead-band	U8 ro	0x06	
	0x01	Joystick X direction	U32 rw eeprom	0x00001F40	8% dead-band
	0x02	Joystick Y direction	U32 rw eeprom	0x00001F40	8% dead-band
	0x03	Roller 1	U32 rw eeprom	0x00002710	10% dead-band
	0x04	Roller 2	U32 rw eeprom	0x00002710	10% dead-band
	0x05	Roller 3	U32 rw eeprom	0x00002710	10% dead-band
	0x06	Roller 4	U32 rw eeprom	0x00002710	10% dead-band
0x6462	0x00	Post-scaling	U8 ro	0x06	Output scaling factor (0 = no scaling, factor in 0.001 steps (1000 = 1:1)
	0x01	Joystick X direction	U32 rw eeprom	0x00000000	no post scaling
	0x02	Joystick Y direction	U32 rw eeprom	0x00000000	no post scaling
	0x03	Roller 1	U32 rw eeprom	0x00000000	no post scaling
	0x04	Roller 2	U32 rw eeprom	0x00000000	no post scaling
	0x05	Roller 3	U32 rw eeprom	0x00000000	no post scaling
	0x06	Roller 4	U32 rw eeprom	0x00000000	no post scaling

MHDC INSTALLATION DRAWING



**SETTING SOFTWARE ENVIRONMENT**

**MDC CUSTOMER SUITE** allows parameters setting also for CANopen MHDC Joystick. The parameters that can be set and adjusted during setting process on field are:

CANopen version: ID Bit rate [Kbps], ON-OFF termination resistor, TPDO Message timing (ms).

Contact Hydreco for more informations.



Home Page



CANopen Version

**DEVICE SETTINGS**

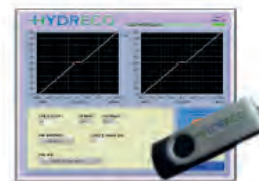
**MDC M8 Programming Kit**  
Code: G9634012403



USB RS232 CONVERTER  
HYDRECO Part Number: C9634210413



CABLE KIT RS232 FEMALE M8 FEMALE  
HYDRECO Part Number: P9634023883



USB KEY MDC HYDRECO CUSTOMER SUITE  
HYDRECO Part Number: G9634010703

NOTE ABOUT PIN MAP CABLE KIT RS232 DB9 FEMALE M8 3 PIN FEMALE



When viewed from the front of the connector ie. not the pins solder side.  
The pin numbering layout used can be seen in the table below.

Signal		Pin(s)	Pin(s)
Transmit Data	TD	2	C
Receive Data	RD	3	A
Request To Send	RTS		
Clear To Send	CTS		
Signal Ground	SG	5	B
Data Set Ready	DSR		
Carrier Detect	CD		
Data Terminal Ready	DTR		

Supported by a worldwide network



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