HYDRECO

ADVANCED HYDRAULIC TECHNOLOGIES

MDC SERIES

MULTIFUNCTION DIGITAL CONTROL JOYSTICK

TECHNICAL CATALOGUE

MDC PILOT CONTROL

The MDC 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.

MDC versatility and flexibility of use satisfies the most demanding customer's requirements, offering a complete range of output versions: CANopen, 0-5 Volt, PWM, Ratiometric.

Our engineers can offer specialistic support to optimize the solution which suits each application.

FEATURES

- Compact, lightweight and robust PA66 body with glass fiber.
- Reliable embedded electronics and strong mechanical structure for long operating life.
- Suitable for armrest of console mounting.
- Wide range of electrical options in multifunctional ergonomic handles.
- Optional friction and detent functions available on single axis version.
- IP65 Protection
- Available for the different output versions of the joystick.
- PC Software environment to set CANopen and PWM joystick's parameters.
- MDC Joystick are compliant with the EMC Directive and the following regulations :
  UNI EN 13309:2010 / 14982:2009
  CEI EN 61000-6-2:2006-10 / 61000-6-4:2007-11
  61000-6-4/A1:2013-06

MDC SERIES - MODEL CODING

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

Handle Code *

* Defined by Hydreco (only for MFE, MFE2 and EXM)

Firmware Version

SXXXX	=	Firmware Code

Return Spring

F0	=	Standard : 1,2 to 2,5 daN
F1	=	Medium : 1,7 to 3,2 daN

Joystick Version

A5V	=	0,5 - 4,5 V Output Voltage
PWM	=	PWM Currents Output
CAN	=	CANopen Output
RTM	=	Ratiometric Output

Handle Type **

W	=	Without handle
S	=	Straight Series (Handle Catalogue)
E	=	MFE Handle
EX	=	Multifunctional EXM Handle
M	=	MFE2 Handle

** See *Handle* catalogue

Basic Model Type

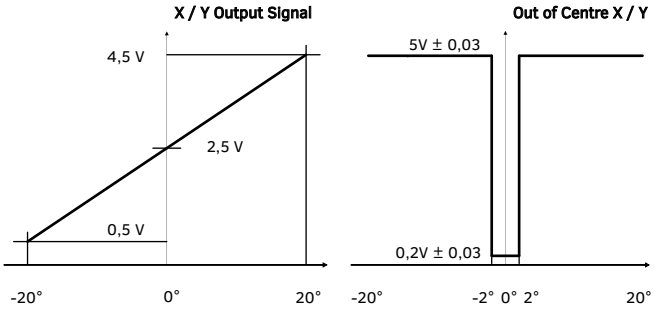
C01	=	Double Axis return to spring
S01	=	Single Axis return to spring
S02	=	Single Axis lever detented in any position
S03	=	Single Axis lever detented in any position with neutral sensor
S04	=	Single Axis lever detented at both stroke ends
S05	=	Single Axis lever detented in neutral position
S06	=	Single Axis lever detented in neutral and frictioned in any position

Model

MDC	=	Multifunction Digital Control

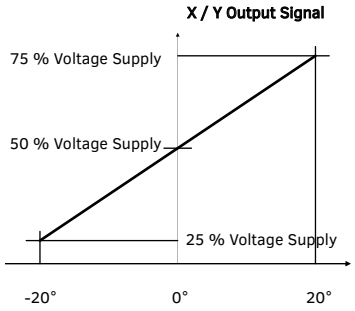
0-5 VERSION GENERAL TECHNICAL FEATURES

Voltage supply:	9 V to 32 V
Output voltage range on X/Y Axis:	0,5 ÷ 4,5 V
Tolerance on output signal:	± 0,03 V
Out of central position:	2 out 0-5 V @ 15mA
Mechanical life:	>5 million cycles
IP protection:	IP 65
Operating temperature:	-40°÷ 85° C



RATIOMETRIC VERSION TECHNICAL FEATURES

Voltage supply:	9 V to 32 V
Output voltage range on X/Y Axis:	25%Vcc-75%Vcc
Digital outputs:	1 for each semi-axis@500mA
Power digital outputs:	2 power digital outputs@5A
Mechanical life:	>5 million cycles
IP Protection:	IP65
Operating temparature:	-40° ÷ 85° C



WIRING TABLE MDC 0-5V

WIRE COLOR	**FUNCTION**
RED	12 / 24 VBatt
BLACK	Gnd
YELLOW	X Axis
GRAY	Y Axis
GREEN	Y Out of centre
ORANGE	X Out of centre

WIRING TABLE MDC RATIOMETRIC

WIRE COLOR	**FUNCTION**
RED	12 / 24 VBatt
BLACK	Gnd
YELLOW	X Axis output signal
GREEN	Power On-Off out of centre Y Axis
GREY	Y Axis output signal
ORANGE	Power On-Off Out of centre X Axis
BLUE (1)	ON-OFF Out of centre (South)
BLUE (2)	ON-OFF Out of centre (North)
BLUE (3)	ON-OFF Out of centre (West)
BLUE (4)	ON-OFF Out of centre (East)

CANopen VERSION TECHNICAL FEATURES

Voltage supply:	9 V to 32 V
Proportional axis:	Up to N.4
Digital input:	6 ON-OFF (0-5V)
CANopen joystick bit rate:	125-250-500-1000 kBit/s
Message frequency setting:	20-60 ms
120 Ohm terminator setting:	ON/OFF
Mechanical life:	>5 million cycles
Ip protection:	IP65
Operating temperature:	-40°C ÷ 85° C

WIRING TABLE MDC CANopen

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

CANopen MESSAGE CONTENT TX PDO

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
				Bit 0 : Axis 1+	Bit 0 : DIG_1		Bit 0 - 3:
				Bit 1 : Axis 1-	Bit 1 : DIG_2		Firmware
Position	Position	Position	Position	Bit 2 : Axis 2+	Bit 2 : DIG_3		version
Axis 1	Axis 2	Axis 3	Axis 4	Bit 3 : Axis 2-	Bit 3 : DIG_4	Zero	
0 ÷ 250	0 ÷ 250	0 ÷ 250	0 ÷ 250	Bit 4 : 0	Bit 4 : DIG_5		Bit 4 - 7:
				Bit 5 : 0	Bit 5 : DIG_6		Counter
				Bit 6 : 0	Bit 6 : 0		0 ÷ 15
				Bit 7 : 0	Bit 7 : 0		

CANopen DICTIONARY

Communication Profile Area covers index form 1000 to 1FFF

Index	Sub	Designation	Type	Default	Description
1000	0	Device type	U32, rwr	0x00050191	Profile 401; Inputs binary and analog
1800	0	Transmit PDO 1	U8, rwr	0x05	Number of the entries Trans PDO 1 **Binary inputs**
	1	COB ID PDO 1	U32, rwr	0x180 + NODE ID	• PDO is valid (bit 31=0) • CAN ID of the 1st Trans PDOs
	2	Trans type PDO 1	U8, rwr	0xFE	• 0xFE = asynch manuf. Specific event, inputs are transferred on event timer
	3	Inhibit timer	U16, rwr	0x64(100)	Min period time before 2 transmission (0 ..65535 ms)
1A00	0	Mapping Trans PDO 1	U8, rwr	0x01	Number of the application objects linked with the binary input PDO 1
	1	Index in the object directory	U32, rwr	0x6400 01 08	Axis 1
	2	Index in the object directory	U32, rwr	0x6400 02 08	Axis 2
	3	Index in the object directory	U32, rwr	0x6400 03 08	Roller 1
	4	Index in the object directory	U32, rwr	0x6400 04 08	Roller 2
	5	Index in the object directory	U32, rwr	0x6000 01 08	1 byte binary Axis out of center bits 1..8, 8 bits lenght
	6	Index in the object directory	U32, rwr	0x6000 02 08	1 byte binary inputs bits 1..6, 8 bits lenght
	7	Index in the object directory	U32, rwr	0x6000 03 08	1 byte binary errors bits 1..8, 8 bits lenght
	8	Index in the object directory	U32, rwr	0x6000 04 08	1 byte binarystatus inputs bits 1..8, 8 bits lenght

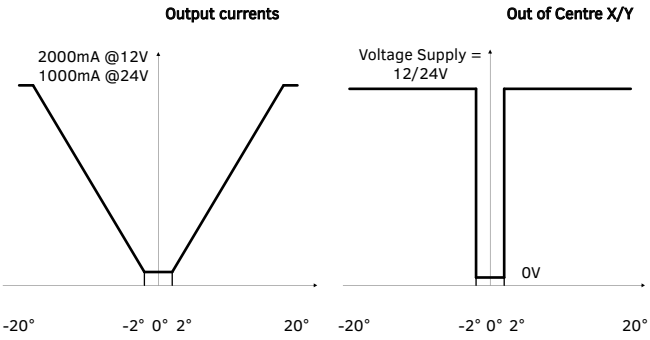
DEVICE SPECIFIC PROFILE AREA

Manufacturer Specific Profile Area covers index from 0x2000 to 0x5FFF.
Device Specific Profile Area covers index from 0x6000 to 0x6FFF

6000	0	Read 8bit In	U8, rwr	0x02	Number of inputs 8 bit						
	1	AXIS OUT OF CENTRE	U8, rwr	0x00	Msb Roller 2 backward	Roller 2 forward	Roller 1 backward	Roller 1 forward	Axel2 left	Axel2 right	Axel1 backward	Lsb Axel1 forward
	2	DIN 1 .. 6	U8, rwr	0x00	Msb 0	0	DI6	DI5	DI4	DI3	DI2	Lsb DI1
	3	Errors	U8, rwr	0x00	Msb 00	0	0	0	0	0	0	Lsb 0
	4	Status	U8, rwr	0x00	Msb Firmware Revision						Transmission Counter 0..15	Lsb
6400	0	Write 8bit Out	U8, rwr	0x04	Number of Axis							
	1	Forward / Backward axis	U8, rwr	0x00	Range 0..124 125 126..250						Means Backward Center Forward	
	2	Left / Right Axis	U8, rwr	0x00	Range 0..124 125 26..250						Means Left Center Right	
	3	Roller 1	U8, rwr	0x00	Range 0..124 125 126..250						Means Backward Center Forward	
	4	Roller 2	U8, rwr	0x00	Range 0..124 125 126..250						Means Backward Center Forward	

PWM VERSION TECHNICAL FEATURES

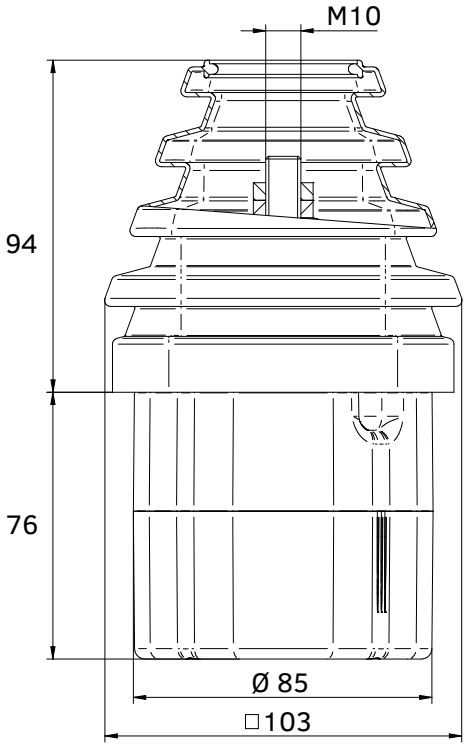
Voltage supply:	9 V to 32 V
Outputs	4 PWM currents signals on each semi-axis with 100 % duty cycle load
Digital out of centre signals:	One for each semi-axis@500mA
Digital control:	Closed-loop digital controlled outputs
Output currents:	100÷2000mA@12V; 100÷1000mA@24V
Ramps:	0-2sec
Dither:	100Hz,150Hz,200Hz,250Hz
Programming software:	MDC settings environment with PC USB Windows interface
Mechanical life:	>5 million cycles
Ip Protection:	IP65
Operating temperature:	-40°C ÷ 85° C

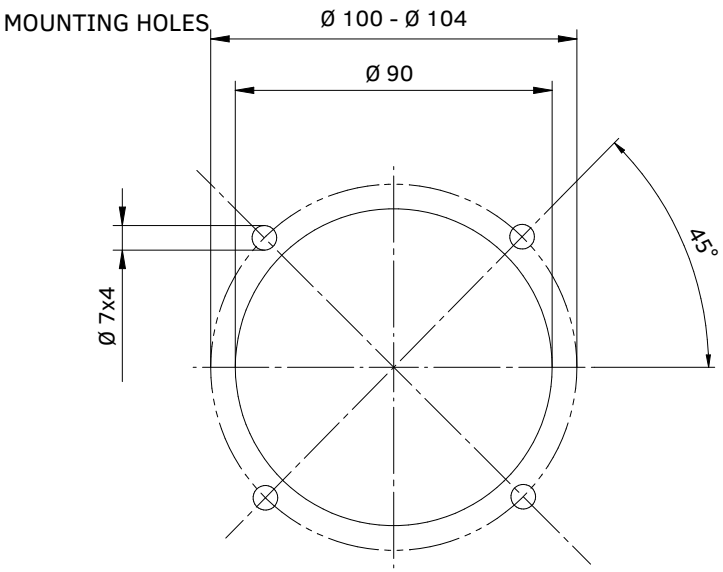


WIRING TABLE MDC PWM

WIRE COLOR	FUNCTION
RED	12 / 24 VBatt
BLACK	Gnd
WHITE	X Axis Outout signal (East)
YELLOW	Y Axis Output signal (South)
GREEN	Y Axis Output signal (North)
GREY	X Axis Output signal (West)
ORANGE	X Axis Common GND (West-East)
BROWN	Y Axis Common GND (Morth-South)
BLUE(1)	ON-OFF Out of centre (South)
BLUE(2)	ON-OFF Out of centre (North)
BLUE(3)	ON-OFF Out of centre (West)
BLUE(4)	ON-OFF Out of centre (East)

MDC INSTALLATION DRAWING





MDC SOFTWARE ENVIRONMENT

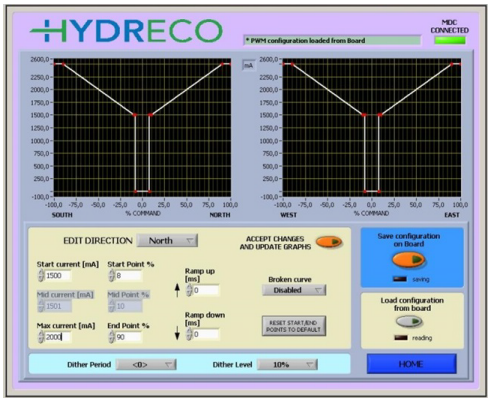
MDC CUSTOMER SUITE allows parameters setting for PWM and CANopen MDC Joystick. The parameters that can be set and adjusted during setting process or test on field are:

PWM version: Start current[mA], Mid Current[mA], Max current[mA], Dither[Hz], Ramps[ms].
CANopen version: ID, Bit rate[Kbps], ON-OFF termination resistor, TPDO Message timing[mS].

Contact Hydreco for more informations.

Home Page

CANopen Version



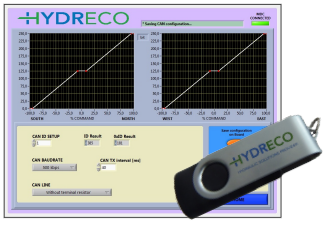
PWM Version

MDC DEVICE SETTINGS

MDC Programming Kit
Code: G9634010393

USB RS232 CONVERTER
HYDRECO Part Number: C9634210413

CABLE KIT RS232 FEMALE DEUTSCH DT06-3S-CE06
HYDRECO Part Number: C9534010383



USB KEY MDC HYDRECO CUSTOMER SUITE
HYDRECO Part Number: G9634010703

NOTE ABOUT PIN MAP
CABLE KIT RS232 FEMALE DEUTSCH
DT 06 -3S-CE06

DEUTSCH DT06-3S-CE06

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

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

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QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001:2015

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