

JOYSTICKS AND GRIPS



Section / Description	page
FINGERTIP PROPORTIONAL CONTROL LEVERS AND SWITCHES	JK3
HEAVY DUTY MULTI-AXIS JOYSTICKS	JK21
ERGONOMIC GRIPS	JK40
ACCESSORIES	JK57



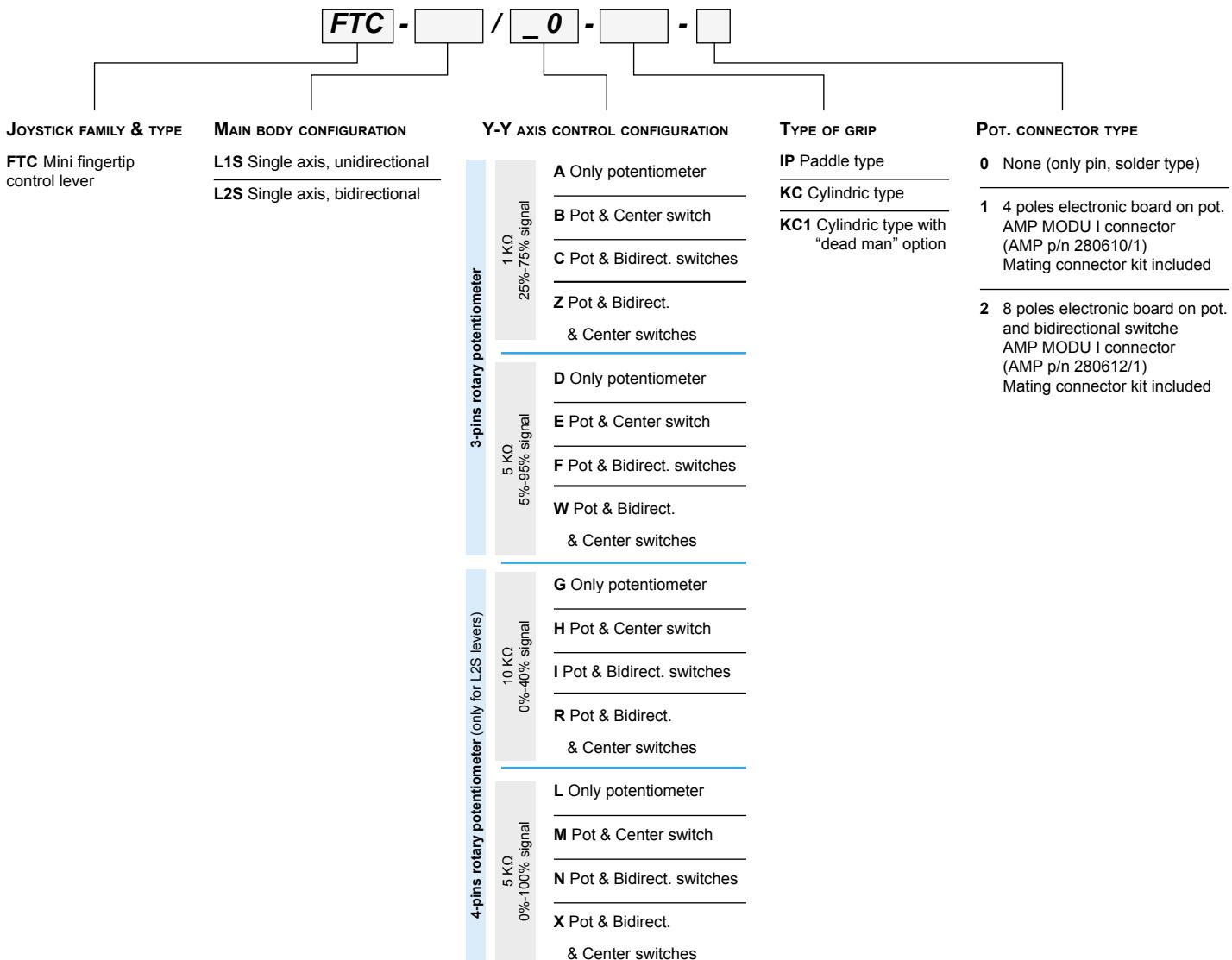
1800-OILSOL <https://oilsolutions.com.au/>
1800-645765

sales@oilsolutions.com.au

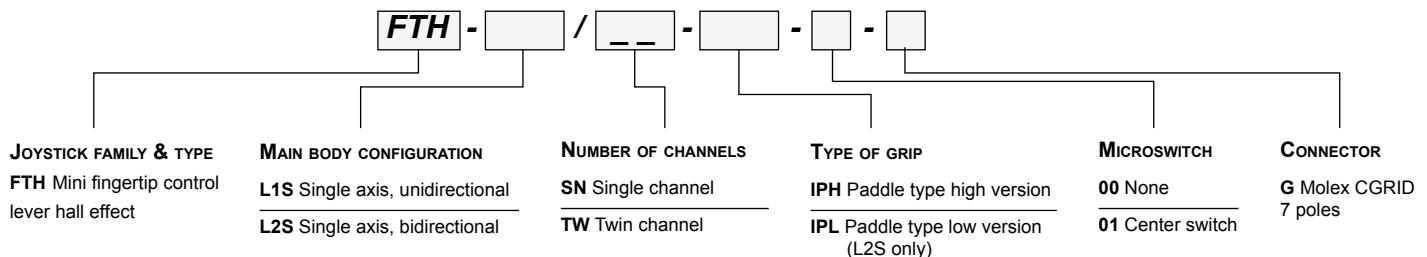
FINGERTIP PROPORTIONAL CONTROL LEVERS AND SWITCHES

DESCRIPTION	ORDERING INFORMATION PAGE	TECHNICAL INFORMATION PAGE
FTC proportional control lever	JK4	JK9-10
FTH contactless proportional control lever	JK5	JK12-13
JLP proportional control lever	JK6	JK14-15
FPR proportional roller switch	JK7	JK16
RLP-L2S roller low profile with hall effect sensor	JK7	JK17
FPR - PWM proportional roller switch	JK7	JK18
JMT proportional multi-axis	JK8	JK19

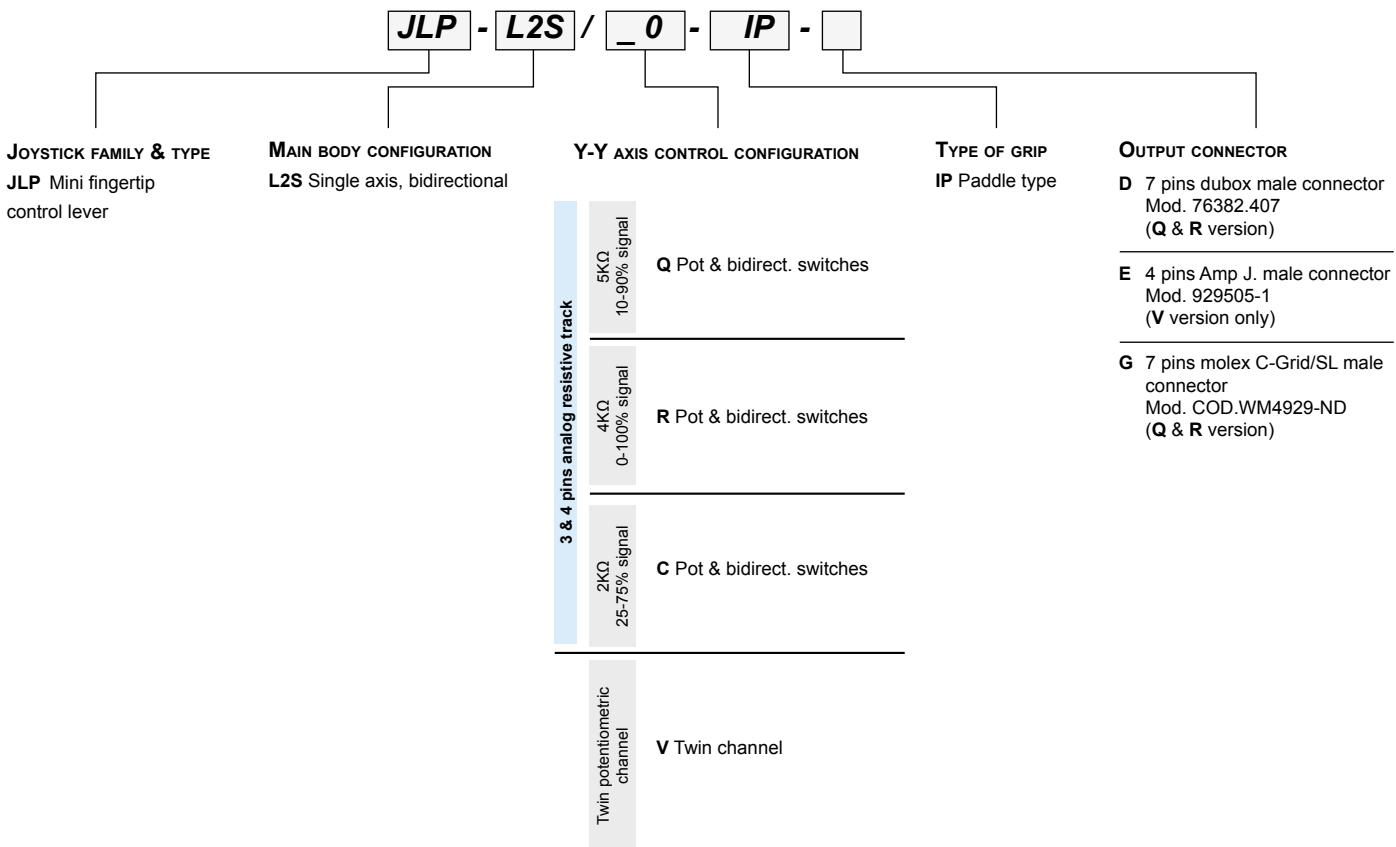
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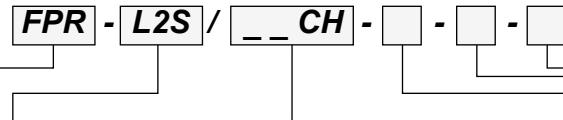
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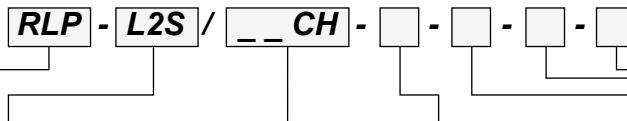
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FPR FINGERTIP PROPORTIONAL SWITCHES

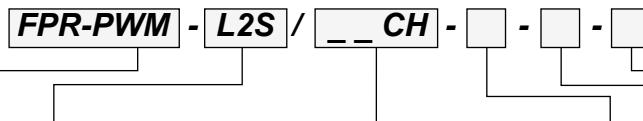
ORDERING INFORMATION



JOYSTICK FAMILY & TYPE	MAIN BODY CONFIGURATION	NUMBER OF CHANNELS	POWER SUPPLY RANGE	BODY COLOUR	CONNECTION
FPR Mini proportional Hall effect Roller switch	L2S Single axis, bidirectional	<u>SN</u> Single channel <u>TW</u> Twin channel	0 5 VDC ±5% H 8-32 VDC of power supply	0 Yellow G Grey B Blue GR Green	0 Flying leads M Molex Minifit 4 poles D Deutsch DT04-3P



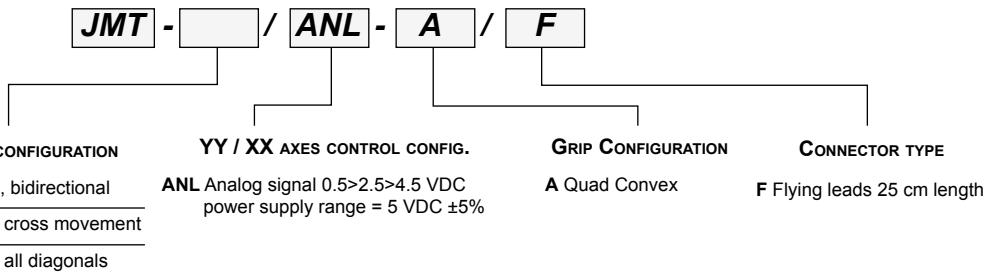
JOYSTICK FAMILY & TYPE	MAIN BODY CONFIGURATION	NUMBER OF CHANNELS	DETENT	PADDLE	BODY COLOUR	CONNECTION
RLP Compact proportional Hall effect Roller	L2S Single axis, bidirectional	<u>SN</u> Single channel <u>TW</u> Twin channel	0 Without Detent D With Detent	0 High L Low	0 Grey	0 Flying leads A Amp CT 6 poles



JOYSTICK FAMILY & TYPE	MAIN BODY CONFIGURATION	NUMBER OF CHANNELS	POWER SUPPLY RANGE	BODY COLOUR	CONNECTION
FPR Mini Proportional Hall effect Roller switch with PWM driver	L2S Single axis, bidirectional	<u>SN</u> Single channel for dual coil proportional valve	H 8-32 VDC of power supply	0 Yellow G Grey B Blue	0 Flying leads M Molex Minifit 6 poles

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JMT PROPORTIONAL MULTI-AXIS HALL EFFECT THUMB JOYSTICK



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FTC-L1S FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / unidirectional.
- 3-pins rotary potentiometer.
- Optional enable switch.

MECHANICAL SPECIFICATIONS

Lever deflection angle:	50° ±1°
Electrical angle:	50° ±1°
Operating temperature range:	-25°C / +80°C
Protection class:	IP 65 (above panel)
Life:	3 million cycles

ELECTRICAL SPECIFICATIONS

3-pins rotary potentiometer

Electrical power rating:	0.25 W @ 25°C
Ohmic resistance: / A = 50% of Vin	1 kΩ ±20%
/ D = 90% of Vin	5 kΩ ±20%

Max. operating input voltage (Vin):	48 V or ±24 V
Min. load impedance on pin 2 (signal):	50 kΩ

Max. operating current on pin 2:	1 mA
Output voltage:	see graph

Linearity (resistive track):	2% or better
Connection type:	0 = solder type (no connector) 1 = AMP Modu I/4 poles con. (mating connector kit included)

Neutral position switch (electromechanical type)

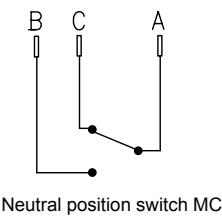
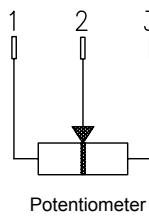
Contact:	silver plated (solder type)
Max. operating input voltage:	48 V or ±24 V
Max. operating current:	1.5 A / inductive
Neutral pos. switch threshold angle:	+4°
Protection class:	IP 55 (IP 67 available on request)

POTENTIOMETER & SWITCHES OPTIONS

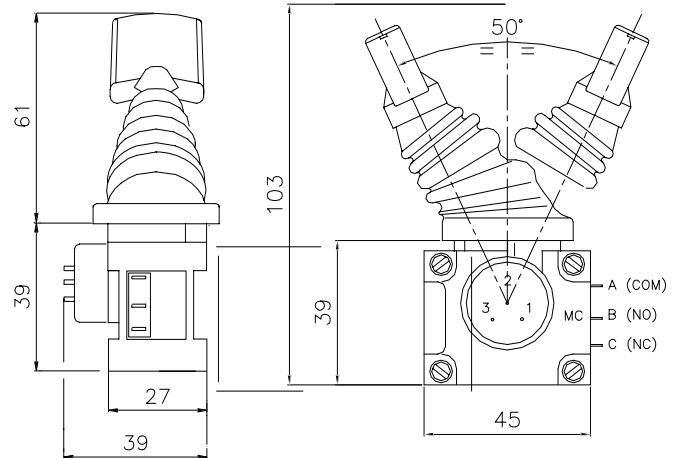
Reference codes

Output signal	S= 50% Vin	S= 90% Vin
3-pins pot	A (Std)	D
3-pins pot & enable switch	B	E

ELECTRICAL CONNECTIONS

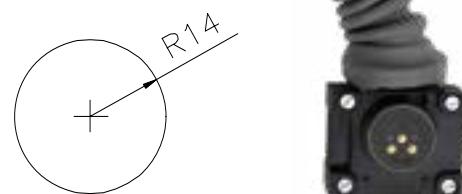


OVERALL DIMENSIONS



Shown with paddle type grip. Small cylindrical grip KC type also available, with optional dead man push button.

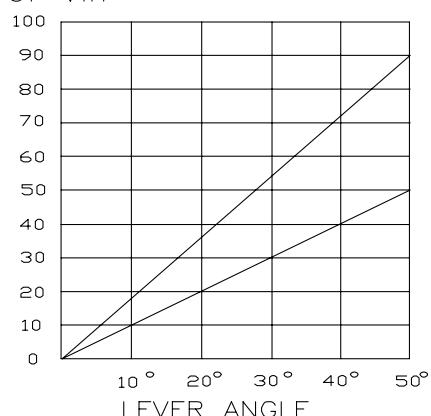
PANEL CUT-OUT



OUTPUT SIGNAL CONTROL CHARACTERISTIC

OUTPUT SIGNAL

% of Vin



FTC ORDERING INFORMATION: see page JK4

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FTC-L2S FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / bidirectional.
- 3-pins rotary potentiometer.
- Optional center / power-off or bidirectional switches.

MECHANICAL SPECIFICATIONS

Lever deflection angle:	$\pm 25^\circ \pm 1^\circ$
Electrical angle:	$\pm 25^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +80°C
Protection class:	IP 65 (above panel)
Life:	3 million cycles

ELECTRICAL SPECIFICATIONS

3-pins rotary potentiometer

Electrical power rating:	0.25 W @ 25°C
Ohmic resistance: / A = 50% of Vin	1 kΩ ±20%
/ D = 90% of Vin	5 kΩ ±20%
Max. operating input voltage (Vin):	48 V or ±24 V
Min. load impedance on pin 2 (signal):	50 kΩ
Max. operating current on pin 2:	1 mA
Output voltage:	see graph
Linearity (resistive track):	2% or better
Connection type:	0 = solder type (no connector) 1 = AMP Modu I/ 4 poles con. (mating connector kit included)

Center / bidirectional switches (electromechanical type)

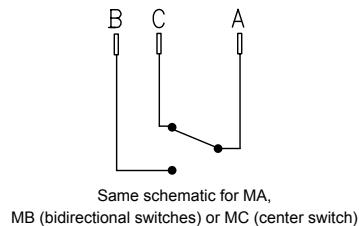
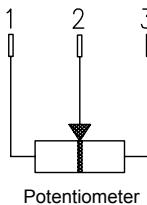
Contacts:	silver plated (solder type)
Max. operating input voltage:	48 V or ±24 V
Max. operating current:	1.5 A/inductive
Neutral pos. switch threshold angle:	+4°
Protection class:	IP 55

POTENTIOMETER & SWITCHES OPTIONS

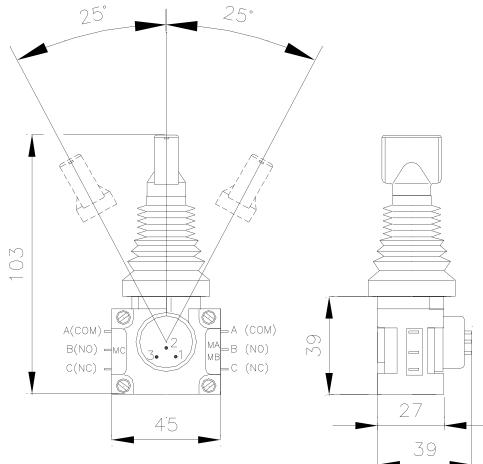
Reference codes

Output signal	S= 50% Vin	S= 90% Vin
3-pin potentiometer	A	D
3-pin pot & center switch	B	E (Std)
3-pin pot & bidirectional switch	C	F

ELECTRICAL CONNECTIONS

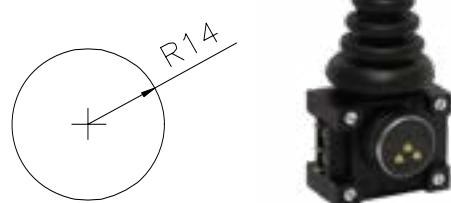


OVERALL DIMENSIONS

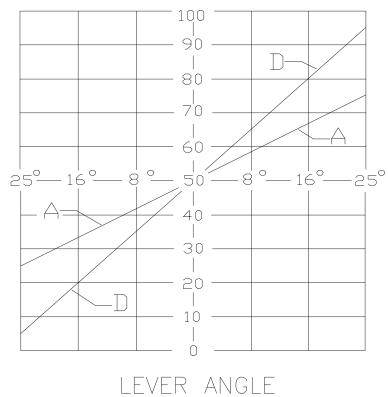


Shown with paddle type grip. Small cylindrical grip KC type also available, with optional dead man push button.

PANEL CUT-OUT



OUTPUT SIGNAL CONTROL CHARACTERISTIC

OUTPUT SIGNAL
% of Vin

3-pins potentiometer configuration

FTC ORDERING INFORMATION: see page JK4

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FTC-L2S FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / bidirectional.
- 4-pins rotary potentiometer.
- Optional center / power-off or bidirectional switches.

MECHANICAL SPECIFICATIONS

Lever deflection angle:	$\pm 25^\circ \pm 1^\circ$
Electrical angle:	$\pm 25^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +80°C
Protection class:	IP 65 (above panel)
Life:	3 million cycles

ELECTRICAL SPECIFICATIONS

4-pins rotary potentiometer

Electrical power rating:	0.25 W @ 25°C
Ohmic resistance: / G = 40% of Vin	$1 \text{ k}\Omega \pm 20\%$
/ L = 100% of Vin	$5 \text{ k}\Omega \pm 20\%$
Max. operating input voltage (Vin):	48 V or ± 24 V
Min. load impedance on pin 2 (signal):	50 kΩ
Max. operating current on pin 2:	1 mA
Output voltage:	see graph
Linearity (resistive track):	2% or better
Connection type:	0 = solder type (no connector) 1 = AMP Modu I/ 4 poles con. (mating connector kit included)

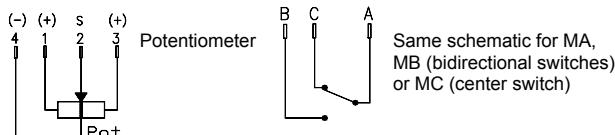
Center / bidirectional switches (electromechanical type)

Contacts:	silver plated (solder type)
Max. operating input voltage:	48 V or ± 24 V
Max. operating current:	1.5 A/inductive
Neutral pos. switch threshold angle:	+4°
Protection class:	IP 55 (IP 67 available on request)

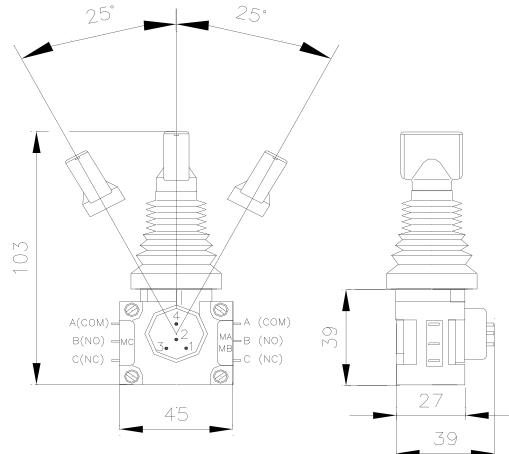
POTENTIOMETER & SWITCHES OPTIONS

Reference codes		
Output signal	S = 40% Vin	S = 100% Vin
4-pin potentiometer	G	L
4-pin pot & center switch	H	M
4-pin pot & bidirectional switchs	I	N (Std)
4-pin pot & bidirectional switchs & center switch	None	X

ELECTRICAL CONNECTIONS

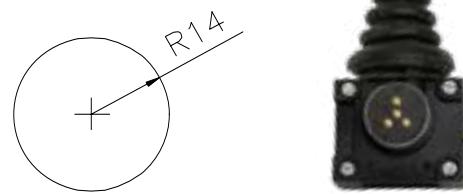


OVERALL DIMENSIONS

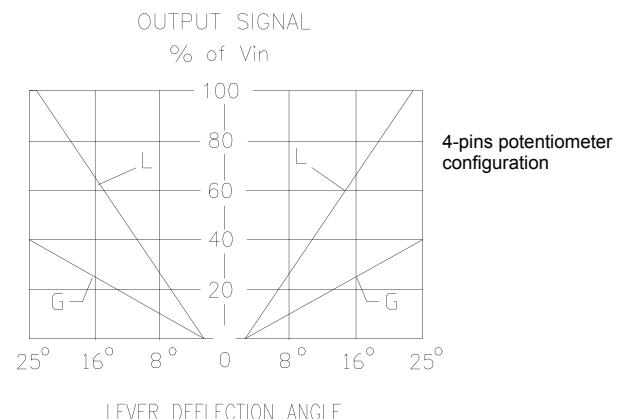


Shown with paddle type grip. Small cylindrical grip KC type also available, with optional dead man push button.

PANEL CUT-OUT



OUTPUT SIGNAL CONTROL CHARACTERISTIC



FTC ORDERING INFORMATION: see page JK4

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FTH-L1S CONTACTLESS FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / unidirectional.
- Contactless, hall effect sensor.
- Optional "out of neutral" switch.
- Optional dual sensor (redundant).

MECHANICAL SPECIFICATIONS

Lever deflection angle:	50° ±1°
Electrical angle:	50° ±1°
Operating temperature range:	-25°C / +80°C
Protection class:	IP 67
Life:	> 3 million cycles (without switch)
Connector:	molex CGRID/SL, 7 male pins

ELECTRICAL SPECIFICATIONS

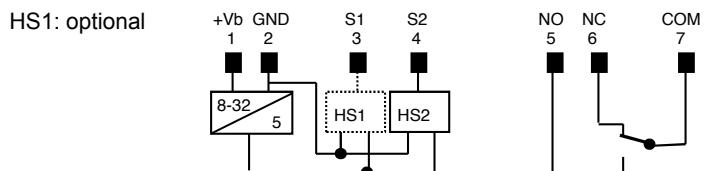
Linear, hall-effect sensor

Power supply voltage:	8÷32 VDC
Current consumption:	< 15 mA (30 mA with 2 sensors)
Output signal in neutral:	0.5 V ±0.1 V
Output signal range:	0.5 V ÷ 4.5 V
Tolerance on output signal:	±0.1 V
Linearity:	< 2%
Max. output current:	1 mA
Directional switch operating voltage:	< 48 VDC
Directional switch max. current:	1 A

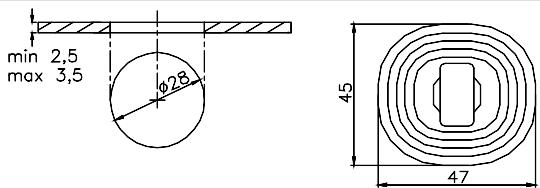
Neutral position switch (electromechanical type)

Contacts:	silver plated (solder type)
Max. operating input voltage:	48 V or ±24 V
Max. operating current:	1 A
Neutral pos. switch threshold angle:	7°
Protection class:	IP 67

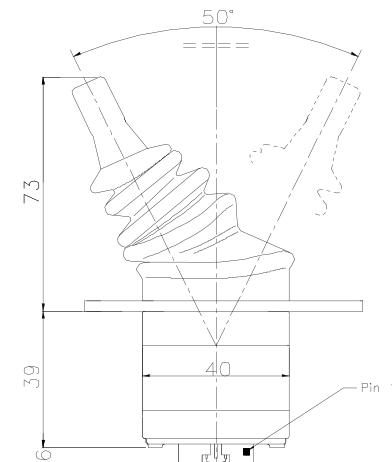
ELECTRICAL CONNECTIONS



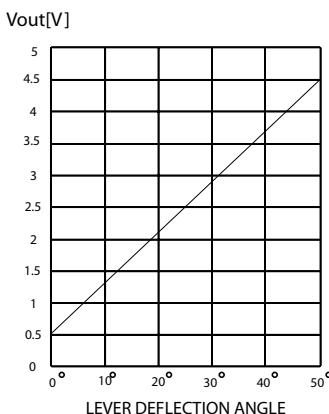
PANEL CUT-OUT AND MOUNTING



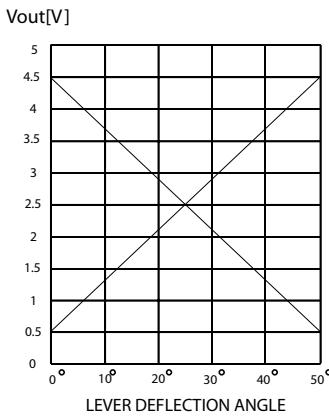
OVERALL DIMENSIONS



OUTPUT SIGNAL CONTROL CHARACTERISTIC



FTH-L1S/SN
(single channel)



FTH-L1S/TW
(dual channel)

FTH ORDERING INFORMATION: see page JK5

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FTH-L2S CONTACTLESS FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / bidirectional.
- Contactless, hall effect sensor.
- Optional "out of neutral" switch.
- Optional dual sensor (redundant).

MECHANICAL / ENVIRONMENTAL SPECIFICATIONS

Lever deflection angle:	$\pm 25^\circ \pm 1^\circ$
Electrical angle:	$\pm 25^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +85°C
Protection class:	IP 67
Life:	> 3 million cycles (without switch)
Connector:	molex CGRID/SL, 7 male pins

ELECTRICAL SPECIFICATIONS

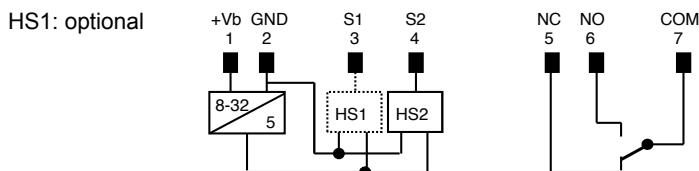
Linear, hall-effect sensor

Power supply voltage:	8-32 VDC
Current consumption:	< 15 mA (30 mA with 2 sensors)
Output signal in neutral:	2.50 V ± 0.1 V
Output signal range:	0.5 V \div 4.5 V
Tolerance on output signal:	± 0.1 V
Linearity:	< 2%
Max. output current:	1 mA
Directional switch operating voltage:	< 48 VDC
Directional switch max. current:	1 A

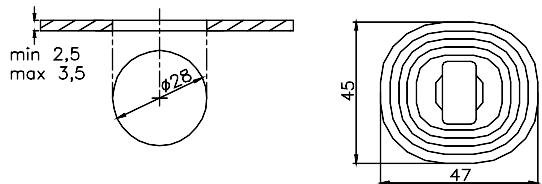
Neutral position switch (electromechanical type)

Contacts:	silver plated (solder type)
Max. operating input voltage:	48 V or ± 24 V
Max. operating current:	1 A
Neutral pos. switch threshold angle:	7°
Protection class:	IP 67

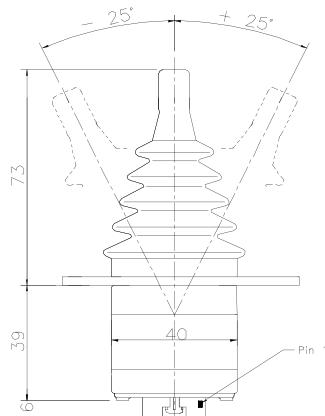
ELECTRICAL CONNECTIONS



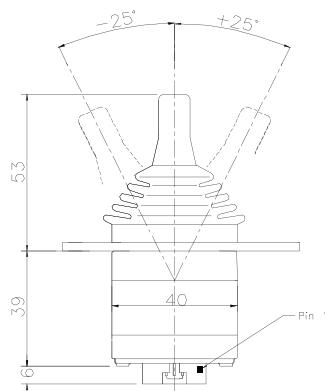
PANEL CUT-OUT AND MOUNTING



OVERALL DIMENSIONS

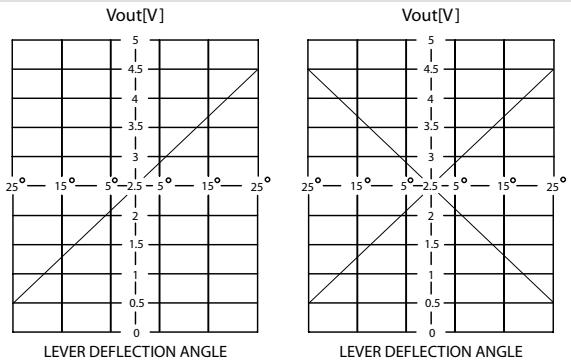


Paddle type high



Paddle type low

OUTPUT SIGNAL CONTROL CHARACTERISTIC



FTH-L2S/SN (single channel)

FTH-L2S/TW (dual channel)

FTH ORDERING INFORMATION: see page JK5

JLP-L2S FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / bidirectional, panel mounting style.
- 3-4 pins potentiometer configuration.
- Bidirectional switches.

MECHANICAL SPECIFICATIONS

Lever deflection angle:	$\pm 32^\circ \pm 1^\circ$
Electrical angle:	$\pm 30^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 (above panel)
Life:	3 million cycles
Fixing screws included:	2 - M4x16

ELECTRICAL SPECIFICATIONS

Potentiometer

Electrical power rating: 0.25 W @ 25°C

Ohmic resistance: / A = 50% of Vin 8 kΩ ±20%

/ Q = 80% of Vin 5 kΩ ±20%

/ R = 100% of Vin 4 kΩ ±20%

Max. operating input voltage (Vin): 48 V or ±24 V

Min. load impedance on pin 5 (signal): 50 kΩ

Max. operating current on pin 5: 1 mA

Output voltage: see graph

Linearity (resistive track): 2% or better

Directional switches

Typical track resistance: 150 Ohm

Max. operating input voltage: 48 V or ±24 V

Min. load impedance on pins 2&3: 50 kΩ

Max. operating current on pins 2&3: 1 mA

Directional switches threshold angle: ±4°

Connector type: Mod. D Dubox = P.N. 76382.407 wiring

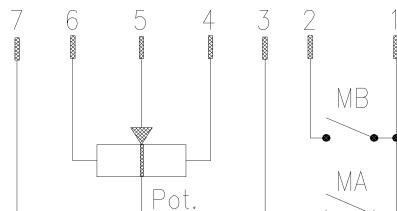
Mod. G Molex = C-Grid P.N. 50-57-9407

POTENTIOMETER & SWITCHES OPTIONS

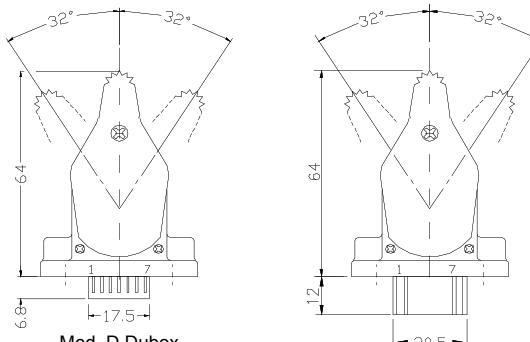
Reference codes

Output signal	S= 80% Vin	S= 100% Vin	S= 50% Vin
3-4 pins pot & bidir. switch	Q	R	C

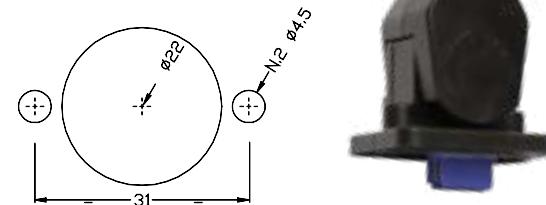
ELECTRICAL CONNECTIONS



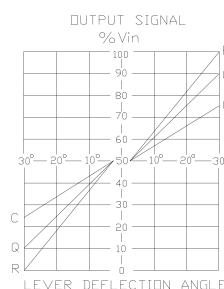
OVERALL DIMENSIONS



PANEL CUT-OUT

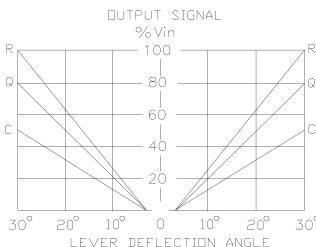


OUTPUT SIGNAL CONTROL CHARACTERISTIC



4	(+)
5	Signal
6	(-)
7	NC

3-pins
configuration wiring



4	(+)
5	Signal
6	(+)
7	(-)

4-pins
configuration wiring

JLP ORDERING INFORMATION: see page JK6

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JLP-L2S TWIN CHANNEL FINGERTIP PROPORTIONAL CONTROL LEVER

FEATURES

- Single axis / bidirectional, panel mounting style.
- Twin channel potentiometer joystick.
- Redundancy on the 100% of the stroke.

MECHANICAL SPECIFICATIONS

Lever deflection angle:	$\pm 32^\circ \pm 1^\circ$
Electrical angle:	$\pm 30^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 (above panel)
Life:	3 million cycles
Fixing screws included:	2 - M4x16

ELECTRICAL SPECIFICATIONS

Potentiometer

Electrical power rating:	0.25 W @ 25°C
Total resistance between pin 1 and 3:	$2 \text{ k}\Omega \pm 20\%$
Nominal voltage supply (Vin):	10 V
Tolerance between track 1 and 2:	$\pm 4\%$ of Vcc
Output voltage:	see graph
Load resistance:	100 $\text{k}\Omega$ - nominal 50 $\text{k}\Omega$ - minimum
Linearity (resistive track):	2% or better
Connector type:	AMP JPT P.N. 929505-1

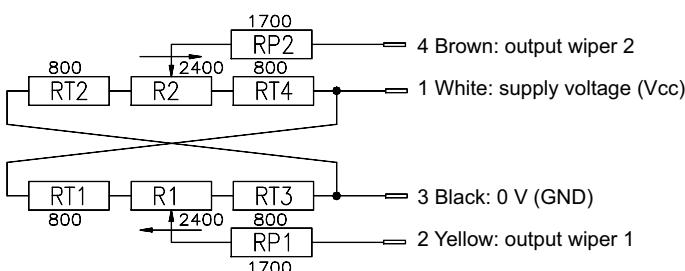
POTENTIOMETER & SWITCHES OPTIONS

Reference codes

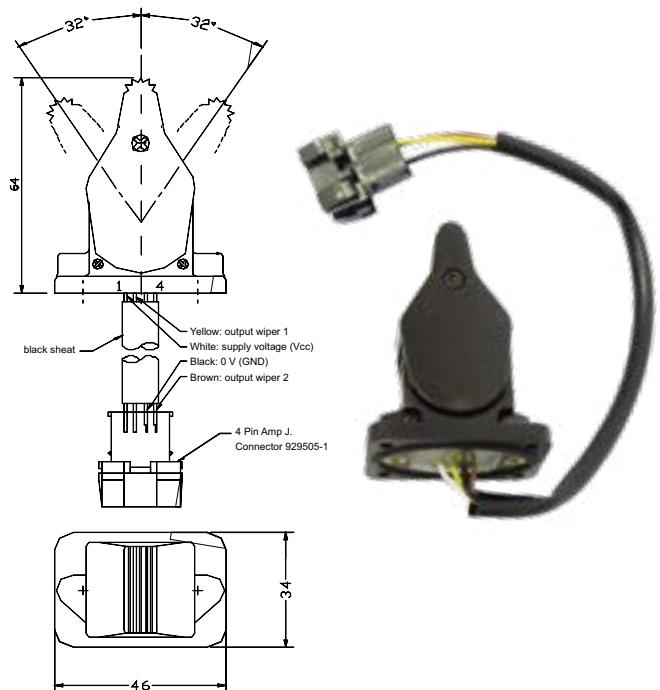
Output signal	S = 60% Vin
3 pins potentiometer	V

ELECTRICAL CONNECTIONS

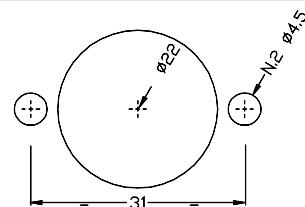
Pinout



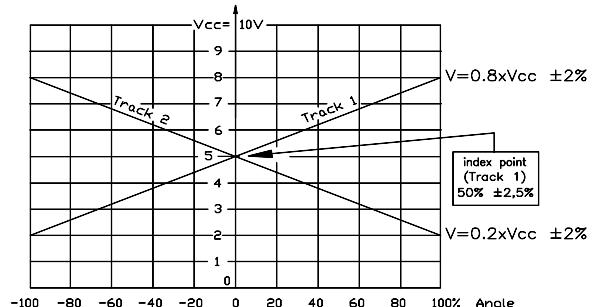
OVERALL DIMENSIONS



PANEL CUT-OUT



OUTPUT SIGNAL CONTROL CHARACTERISTIC



JLP ORDERING INFORMATION: see page JK6

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

FPR-L2S PROPORTIONAL ROLLER SWITCH WITH HALL EFFECT SENSOR**FEATURES**

- Mini proportional roller switch with optimum ergonomic design for panel-mounting.
- High performance hall effect sensor circuitry.
- Twin channel configuration for redundancy.

MECHANICAL SPECIFICATIONS

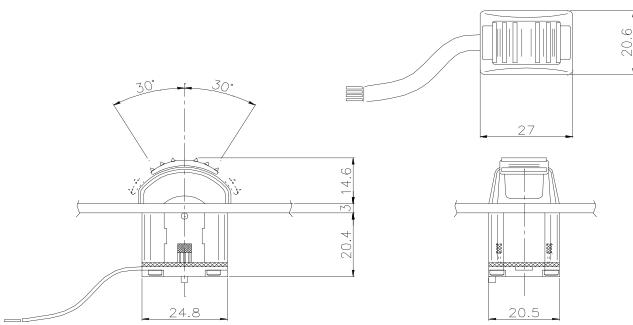
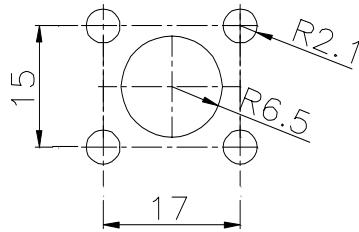
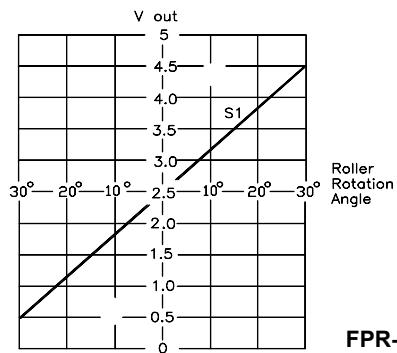
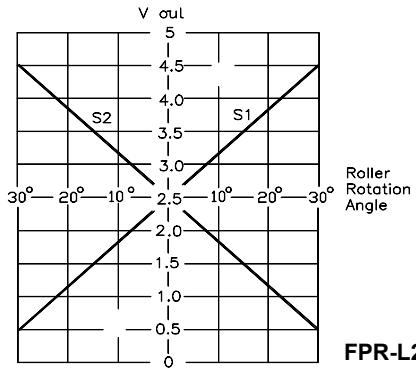
Rotation angle:	$\pm 30^\circ$
Body material:	acetal resin / teflon compound
Colours available:	grey, blue, green, yellow
Rubber gaiter material:	EPDM / 35-45 shore - A
Operating temperature range:	-25°C / +85°C
Environmental protection:	IP 68 (above panel)
Life:	> 5.000.000 cycles

**ELECTRICAL SPECIFICATIONS**

Signal output @ rest:	2.5 VDC ± 0.1 V
Supply voltage:	H - Version = 8÷32 VDC 0 - Version = 5 VDC $\pm 5\%$
Full output signal range:	0.5 - 4.5 V, ± 0.2 V
Current consumption at rest:	SNCH (S1 only) 15 mA TWCH (S1/S2) 25 mA
Rated output current:	1 mA
Connection type:	flying leads = coloured flat cable 100 mm connector = molex Minifit 4 poles P.N. 5559-4P Deutsch 3 poles P.N. DTO4-3P

ELECTRICAL CONNECTIONS

FPR - L2S - SNCH (single chan.)	FPR - L2S - TWCH (twin chan.)
(1) Yellow: +5 VDC	(1) Yellow: + 5 VDC
(2) Orange: (-) ground	(2) Orange: (-) ground
(3) Red: output 1 (S1)	(3) Red: output 1 (S1)
(4) Brown: not used	(4) Brown: output 1 (S2)

OVERALL DIMENSIONS**PANEL CUT-OUT****OUTPUT SIGNAL CONTROL CHARACTERISTIC****FPR-L2S/ SNCH** (single channel)**FPR-L2S-TWCH** (twin channel)**FPR ORDERING INFORMATION:** see page JK7

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

RLP-L2S ROLLER LOW PROFILE WITH HALL EFFECT SENSOR

FEATURES

- Minimum width, low profile joystick that provides smooth, precise fingertip control in one axis.
- Non-contact Hall effect technology for a long working life.
- Twin channel configuration for redundancy.
- Green light on paddle.
- Detent version available (RLP-D).
- Paddle with two heights available.

MECHANICAL SPECIFICATIONS

Rotation angle:	$\pm 30^\circ$
Body material:	acetal resin / teflon compound
Colours available:	grey, blue, green, yellow
Operating temperature range:	-25°C / +85°C
Environmental protection:	IP 68 (above panel)
Life:	> 5.000.000 cycles



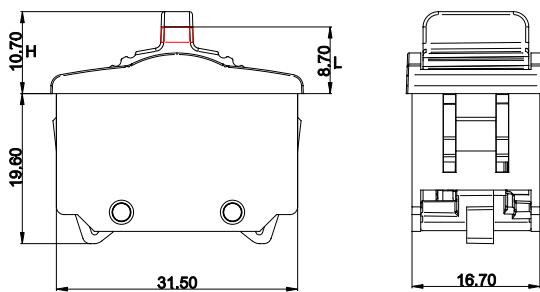
ELECTRICAL SPECIFICATIONS

Signal output @ rest:	2.5 VDC ± 0.1 V
Supply voltage:	5 VDC $\pm 5\%$
Full output signal range:	0.5 - 4.5 V, ± 0.2 V
Current consumption at rest:	SNCH (S1 only) 15 mA TWCH (S1/S2) 25 mA
Rated output current:	1 mA
Connection type:	connector = AMP CT 6 poles 179228-6

ELECTRICAL CONNECTIONS

RLP-L2S-SNCH (single chan.)	RLP-L2S-TWCH (twin chan.)
(1) Red: +5 VDC	(1) Red: +5 VDC
(2) Black: (-) ground	(2) Black: (-) ground
(3) Yellow: output 1 (S1)	(3) Yellow: output 1 (S1)
(4) Green: led enable (-)	(4) Green: led enable (-)
	(5) Blue: output 2 (S2)

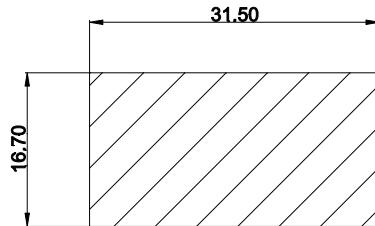
OVERALL DIMENSIONS



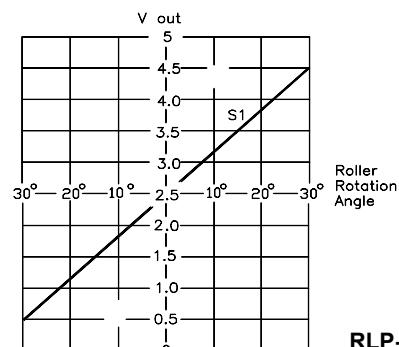
H: High Paddle (std)

L: Low Paddle

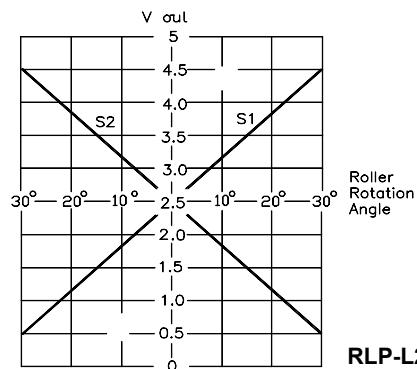
PANEL CUT-OUT



OUTPUT SIGNAL CONTROL CHARACTERISTIC



RLP-L2S/ SNCH (single channel)



RLP-L2S-TWCH (twin channel)

FPR ORDERING INFORMATION: see page JK7

FPR-PWM-L2S PROPORTIONAL ROLLER SWITCH WITH PWM DRIVER

FEATURES

- Mini proportional roller switch with optimum ergonomic design for panel-mounting.
- High performance hall effect sensor circuitry.
- PWM electronic driver integrated into the roller for remote control of a dual-coil proportional solenoid valve.

MECHANICAL SPECIFICATIONS

Rotation angle:	$\pm 30^\circ$
Main body material:	acetal resin / teflon compound
Colours available:	yellow, grey, blue
Rubber gaiter material:	EPDM / 35-45 shore - A
Operating temperature range:	-25°C / +85°C
Environmental protection:	IP 68 (above panel)
Life:	> 5.000.000 cycles

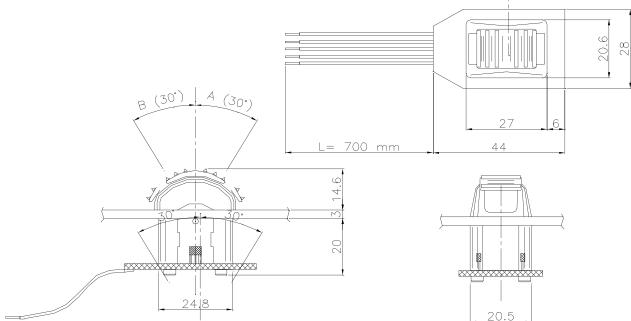
ELECTRICAL SPECIFICATIONS

Supply voltage:	8÷32 VDC
Current consumption with no load:	100 mA
PWM dither frequency:	100 Hz
Wire lenght:	700 mm
Current output range (PWM):	100÷1500 mA @ 12 VDC
Connection type:	flying leads = GLX 0.5 sqmm connector = molex Minifit 6 poles P.N. 5559-6P

ELECTRICAL CONNECTIONS

- (1) Red: +Battery
- (2) Black: -Battery (GND)
- (3) Orange: PWM Valve A+
- (4) Gray: PWM Valve B+
- (5) White: PWM A- / B- (common)
- (6) Not used

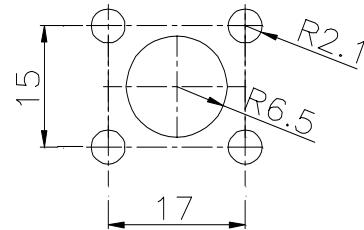
OVERALL DIMENSIONS



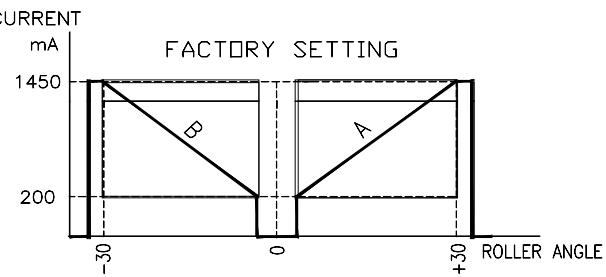
FPR ORDERING INFORMATION: see page JK7



PANEL CUT-OUT



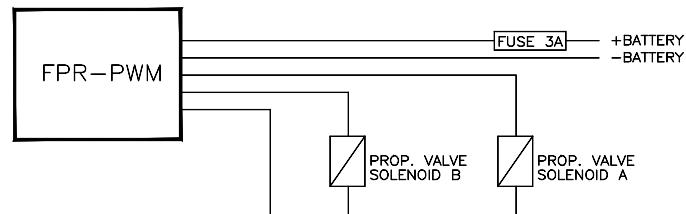
PWM OUTPUT CHARACTERISTIC EXAMPLE



The following values are factory set:

- I_{min} (minimum output current)
- I_{max} (maximum output current)
- Dither

APPLICATION EXAMPLE



Ordering Code

23.0409.160 (Imin = 200mA, Imax = 1500mA, PWM = 100Hz)

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JMT PROPORTIONAL MULTI-AXIS HALL EFFECT THUMB JOYSTICK

FEATURES

- Mini proportional thumb joystick with ergonomic design for panel mounting.
- High performance hall effect sensor circuitry.
- Suitable for grips, controls panels, armrests or belly boxes.
- Analog voltage outputs, factory pre-set.
- One/two axis gated or 360°.
- 1 million cycle mechanical life.

MECHANICAL SPECIFICATIONS

Type of movement:	single, cross or omnidirectional square type
Travel angle:	23°±2°
Operating force with boot:	2-3 N
Maximum vertical/horizontal load:	200 N / 150 N
Life:	1.000.000 cycles
Case material:	Thermoplastic, black
Boot material:	EPDM - UV proof, black
Operating temperature range:	-40°C / +85°C

ELECTRICAL SPECIFICATIONS

Sensor technology:	Hall effect
Supply Voltage:	ANL = 5 VDC ±5%
Protection:	reversed voltage, overvoltage, short circuit on outputs
Current consumption:	< 20 mA
Output signal ratiometric (ref. to 5.0V):	0.5-4.5V
Output voltage tolerance at center:	< 0.25V
Output voltage tolerance at full travel:	< 0.25V
Sealing (fully potted electronics):	IP69K

ELECTRICAL CONNECTIONS

JMT - L2S - single axis

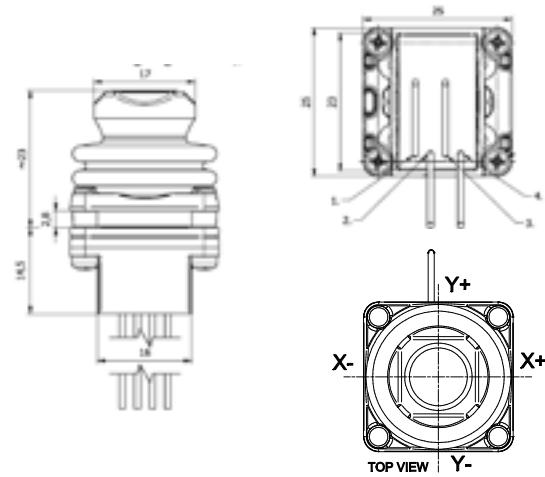
- (1) Red: +5 VDC
- (2) Black: (-) ground
- (3) Yellow: output Y
- (4) Blue: not used

Wires Coloured AWG 24

JMT - L4C/D - dual axis

- (1) Red: +5 VDC
- (2) Black: (-) ground
- (3) Yellow: output Y
- (4) Blue: output X

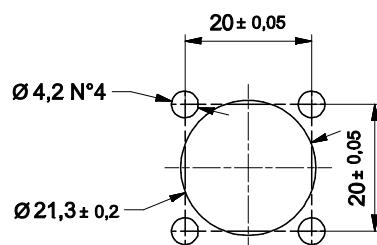
OVERALL DIMENSIONS



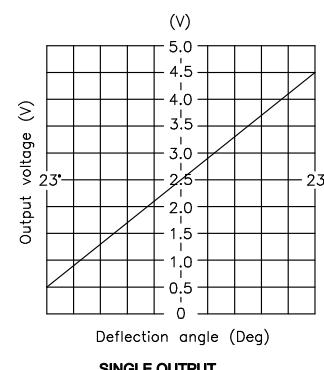
PANEL CUT-OUT

Cutout dimensions

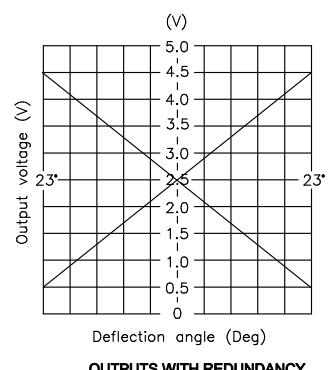
Max panel thickness: 3+-0.2 mm



OUTPUT SIGNAL CONTROL CHARACTERISTIC



SINGLE OUTPUT



DEFLECTION ANGLE (Deg)

OUTPUTS WITH REDUNDANCY

JMT ORDERING INFORMATION: see page JK8

HEAVY DUTY MULTI-AXIS JOYSTICKS

DESCRIPTION	ORDERING INFORMATION PAGE	TECHNICAL INFORMATION PAGE
JMF potentiometric joystick body	JK22	JK24
JHM hall effect joystick body	JK23	JK30

Note: 1) The joystick base does not include the grip.
 2) The joystick base includes the rubber gaither.

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JOYSTICK FAMILY & TYPE	MAIN BASE CONFIGURATION	YY / XX AXES CONTROL CONFIG.	TYPE OF GRIP	GRIP CONFIGURATION	POT. CONNECTOR TYPE
JMF Heavy duty / Multi-axis joystick controller	L1SF Single axis, unidirectional with friction lock	0 No Pot. & switches on Y/X axis	IL Cylindrical knob	Refer to the Grip ordering information for zz e kk axes (push-buttons & proportional controls on grips)	0 Flying leads 25 cm length
	L2S Single axis, bidirectional	2 Only Bidir. switches on Y/X axis	IC Cylindrical		
	L2SF Single axis, bidirectional with friction lock	A Only potentiometer	IE Multi-function ergonomic		
	L4C Dual axes, cross movement	C Pot. & Bidirect. switches	MS Multi-function ergonomic symmetric		
	L4D Dual axes, all diagonals	D Only potentiometer	MG Multi-Function ergonomic right hand		
		F Pot. & Bidirect. switches	HL Multi-function ergonomic left hand		
		G Only potentiometer	HR Multi-function ergonomic right hand		
		I Pot. & Bidirect. switches			
		L Only potentiometer			
		N Pot. & Bidirect. switches			
		4-pins rotary potentiometer			
		3-pins rotary potentiometer			
		2-pins rotary potentiometer			
		1-pins rotary potentiometer			

EXAMPLE:

JMF-L4C/NN
BASEMG/A6P9/0000/R000-0
GRIP

JMF-L4C/NN-MG/A6P9/0000/R000-0
COMPLETE JOYSTICK
(with flying leads)

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JHM HEAVY DUTY MULTI-AXIS JOYSTICK

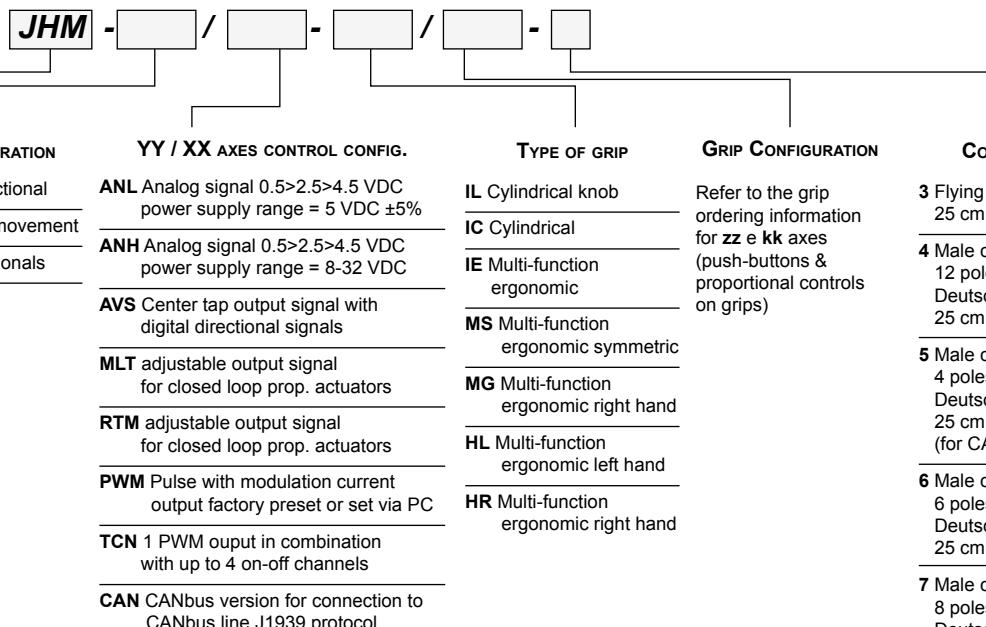
ORDERING INFORMATION

JOYSTICKS

CONNECTOR TYPE
3 Flying leads 25 cm length
4 Male connector, 12 poles, Deutsch DT04-12P, 25 cm cable length
5 Male connector, 4 poles, Deutsch DT04-4P, 25 cm cable length (for CANbus version only)
6 Male connector, 6 poles, Deutsch DT04-6P, 25 cm cable length
7 Male connector, 8 poles, Deutsch DT04-8P, 25 cm cable length

Note:
for TCN, PWM and MLT
versions, a 4 poles, Deutsch
DT04-4P connector is
always included

JHM-L4D/ANH-MS/0000/2FPR/R000-6
COMPLETE JOYSTICK
(with 6 poles Deutsch connector)



EXAMPLE:



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JMF HEAVY DUTY MULTI-AXIS POTENTIOMETRIC JOYSTICK (JOYSTICK BASE ONLY)

FEATURES

The JMF potentiometric joystick controller has been designed for use in mobile and industrial field application. The potentiometer in use, available with 3 or 4-pins configuration, grants precision and a long working life.

When coupled with an **M** range of ergonomic multi-function handles, up to 5 proportional axes and 9 on-off push buttons can be integrated in the same joystick. Power directional switches are available.

AVAILABLE JOYSTICK MOVEMENTS

*Option L1S	Single axis control / Unidirectional
*Option L2S	Single axis control / Bidirectional
Option L4C	Cross axis control / Bidirectional
Option L4D	Multi axis control / Bidirectional

* friction lock option available for L1S and L2S

MECHANICAL SPECIFICATIONS

Lever deflection angle:	$\pm 22^\circ \pm 1^\circ$
Electrical angle:	$\pm 22^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +80°C
Protection class (above panel):	up to IP 67, depending on grip
Life:	3 million cycles

POTENTIOMETER & SWITCHES OPTIONS (Y-Y AND X-X AXIS)

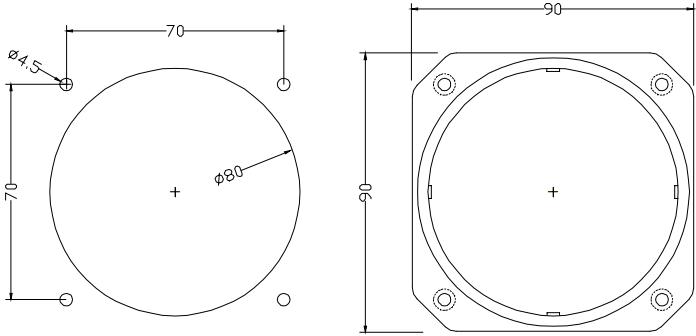
Reference codes

Output signal	S= 50% Vin	S= 90% Vin
3-pins pot	A	D
3-pins pot & bidirectional switchs	C	F (Std)

Reference codes

Output signal	S= 40% Vin	S=100% Vin
4-pins pot	G	L
4-pins pot & bidirectional switchs	I	N (Std)

PANEL CUT-OUT AND MOUNTING



Shown with IC grip

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JMF HEAVY DUTY MULTI-AXIS POTENTIOMETRIC JOYSTICK (JOYSTICK BASE ONLY)

ELECTRICAL SPECIFICATIONS

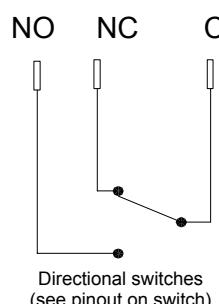
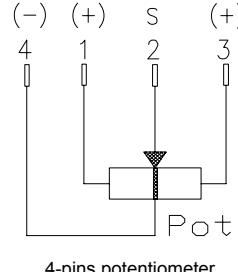
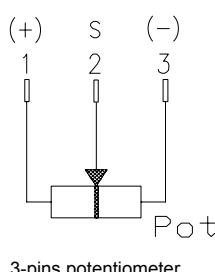
Directional switches (electromechanical type)

Contacts:	silver plated
Max. operating input voltage:	125/250 Vac
Max. operating current:	16 A (5 A on request)*
Pot. connector type:	0 = None (solder type) 1 = AMP Modu I/4 poles
Neutral pos. switch threshold angle:	$\pm 10^\circ$ ($\pm 5^\circ$ on request)*
Protection class:	IP 55 (specials available on request)

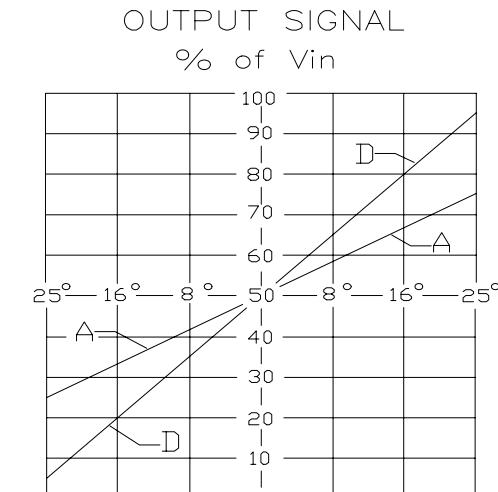
Rotary potentiometer

Electrical power rating:	0.25 W @ 25°C
Ohmic resistance: / A = 50% of Vin	1 k Ω $\pm 20\%$
(3-pins version) / D = 90% of Vin	5 k Ω $\pm 20\%$
Ohmic resistance: / G = 40% of Vin	10 k Ω $\pm 20\%$
(4-pins version) / L = 100% of Vin	5 k Ω $\pm 20\%$
Max. operating input voltage (Vin):	48 V or ± 24 V
Min. load impedance on pin 2 (signal):	50 k Ω
Max. operating current on pin 2:	1 mA
Output voltage:	see graphs
Linearity (resistive track):	2% or better
Protection class:	IP 67

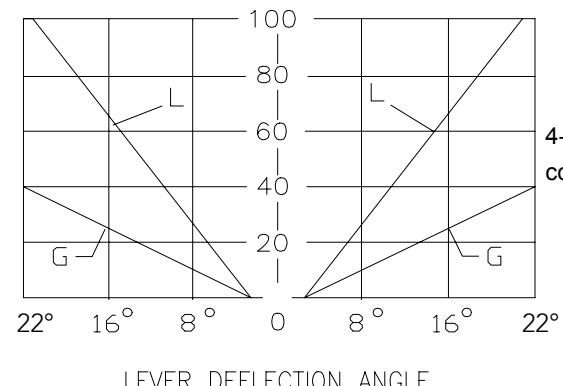
ELECTRICAL CONNECTIONS (for solder type connector)



OUTPUT SIGNAL CONTROL CHARACTERISTICS



LEVER ANGLE

3-pins pot.
configurationOUTPUT SIGNAL
% of Vin

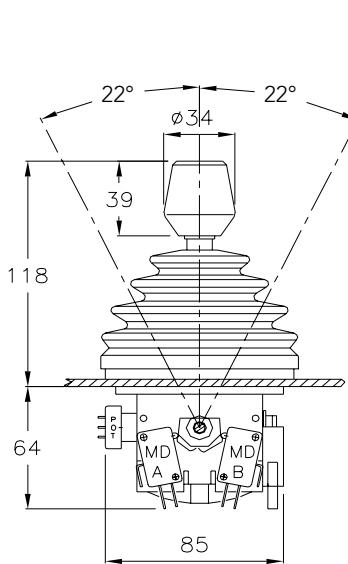
LEVER DEFLECTION ANGLE

4-pins pot.
configuration

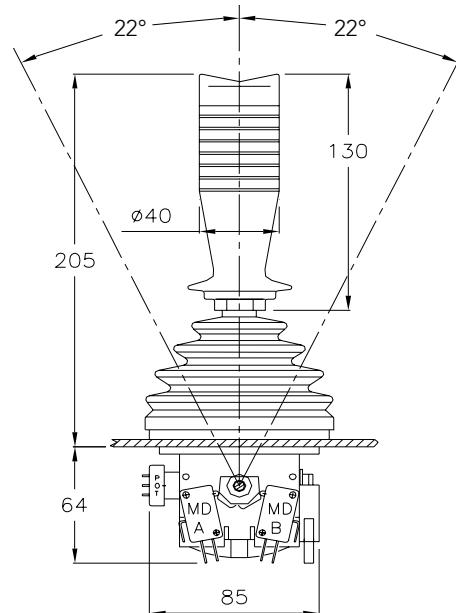
JMF ORDERING INFORMATION: see page JK20

JMF HEAVY DUTY MULTI-AXIS POTENTIOMETRIC JOYSTICK

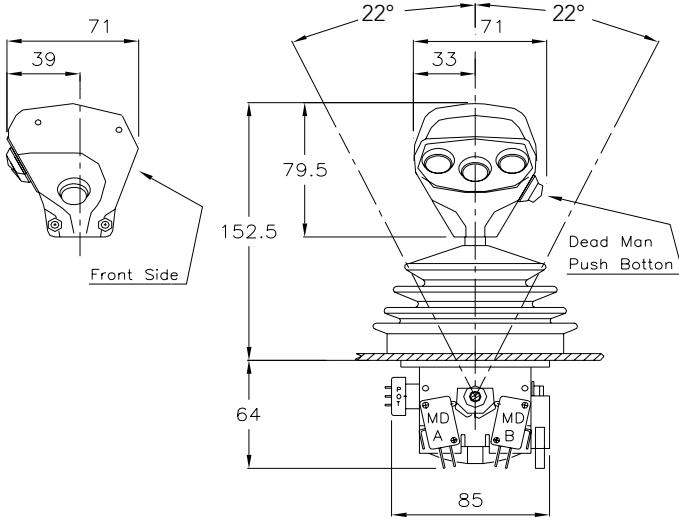
JMF joystick with grips - configuration examples with overall dimensions



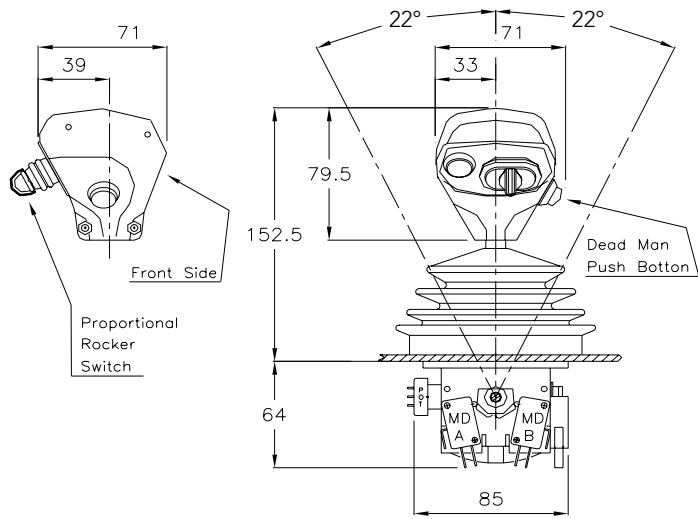
JMF base with IL handle
Complete code: **JMF-L4C/NN-IL 0000**



JMF base with IC handle
Complete code: **JMF-L4C/NN-IC 0200**



JMF base with IE type handle
Complete code: **JMF-L4C/NN-IE A3P9 0000**



JMF base with IE type handle
Complete code: **JMF-L4C/NN-IE A1P9 1PRS**

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JMF HEAVY DUTY MULTI-AXIS POTENTIOMETRIC JOYSTICK

JMF joystick with grips - configuration examples with overall dimensions



JMF base with MS type handle
Complete code: **JMF-L4C/NN-MS A6P9 R3P9**



JMF base with MS type handle
Complete code: **JMF-L4C/NN-MS A2P9 2FPR R1P9**



JMF base with MG type handle
Complete code: **JMF-L4C/NN-MG A4P9 R1P9**

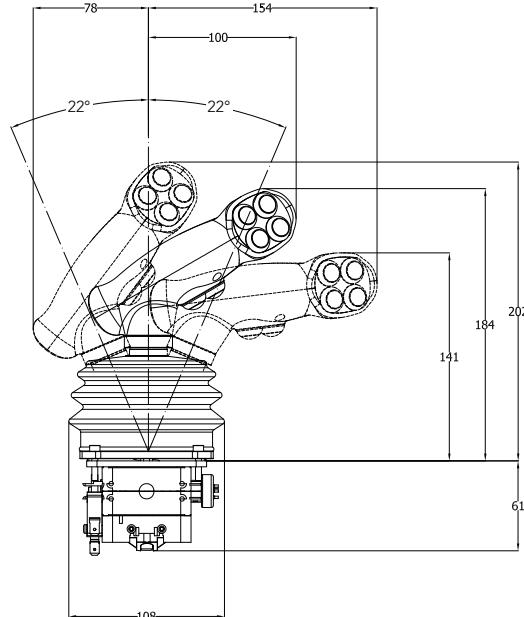


JMF base with MG type handle
Complete code: **JMF-L4C/NN-MG A2P9 1FPR R1P9**

JMF HEAVY DUTY MULTI-AXIS POTENTIOMETRIC JOYSTICK

HL joystick with grips - configuration examples with overall dimensions

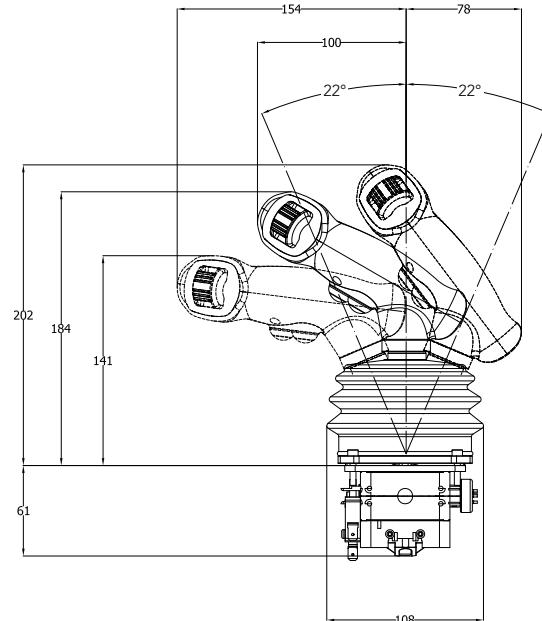
JMF base with HL type handle
Complete code: **JMF-L4C/NN-HL-04P9-2P9/RDFF**



JMF base with HL type handle
Complete code: **JMF-L4C/NN-HL-04P9-2P9/RDFF**



JMF base with HR type handle
Complete code: **JMF-L4C/NN-HR-0FPR-2P9/R000**



JMF base with HR type handle
Complete code: **JMF-L4C/NN-HR-0FPR-2P9/R000**

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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)**FEATURES**

The JHM joystick controller has been designed for use in mobile and industrial field applications. The use of the hall effect sensor, which eliminates any contact between moving electrical parts, improves overall resolution, precision and life. A complete line of built-in electronic drivers, generating on-off, proportional and CANbus control signals, guarantees the highest controllability of any type of electro-hydraulic system.

When coupled with an ergonomic multi-function handle of the **M** range, up to 5 proportional axes and 9 on-off push buttons can be integrated in the same joystick.

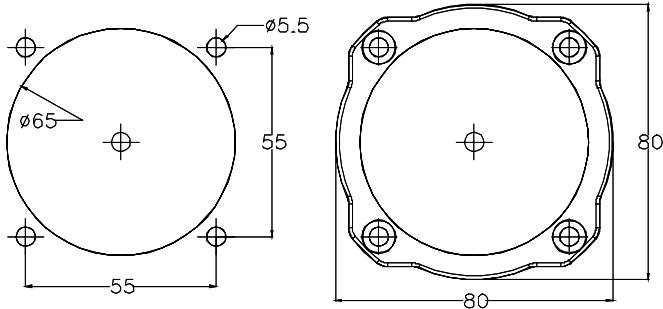
A magnetic position detent on the Y or X axis is also available as option.

MECHANICAL SPECIFICATIONS

Main body material:	aluminium
Boot material:	EPDM - UV proof
Lever deflection angle:	$\pm 22^\circ \pm 1^\circ$
Electrical angle:	$\pm 22^\circ \pm 1^\circ$
Operating temperature range:	-25°C / +80°C
Protection class (above panel):	up to IP 67, depending on grip
Life:	> 5 million cycles

ELECTRICAL SPECIFICATIONS

Sensor:	hall effect contactless technology
Supply voltage:	ANL version = 5 VDC $\pm 5\%$ other versions = 8÷32 VDC
Current consumption @ rest:	25 mA (sensor only)
Connector type:	Deutsch DT04-12P other types available on request
Output signal configuration:	see next pages for all versions

PANEL CUT-OUT AND MOUNTING**AVAILABLE JOYSTICK MOVEMENTS**

Option L2S	Single axis control / Bidirectional
Option L4C	Cross axis control / Bidirectional
Option L4D	Multi axis control / Bidirectional



JHM ORDERING INFORMATION: see page JK21

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

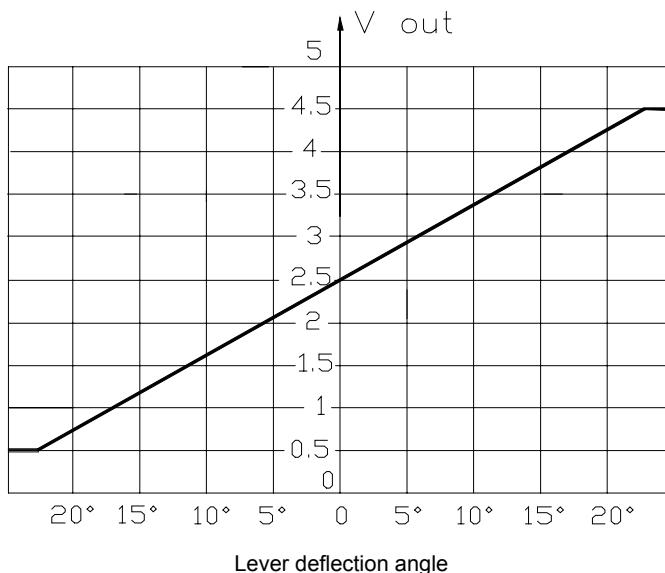
JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

ANL & ANH VERSION

Basic version

Current consumption @ rest:	< 25 mA (sensor only)
Supply voltage:	ANL version = 5 VDC $\pm 5\%$ ANH version = 8÷32 VDC
Signal output @ rest:	2.5 VDC ± 0.2 V
Output signal range:	0.5 ÷ 4.5 V ± 0.2 V (see graph)
Rated output current:	1 mA
Protections (ANH version):	overvoltage and reversed polarity

OUTPUT SIGNAL CONTROL CHARACTERISTICS



AVS VERSIONS

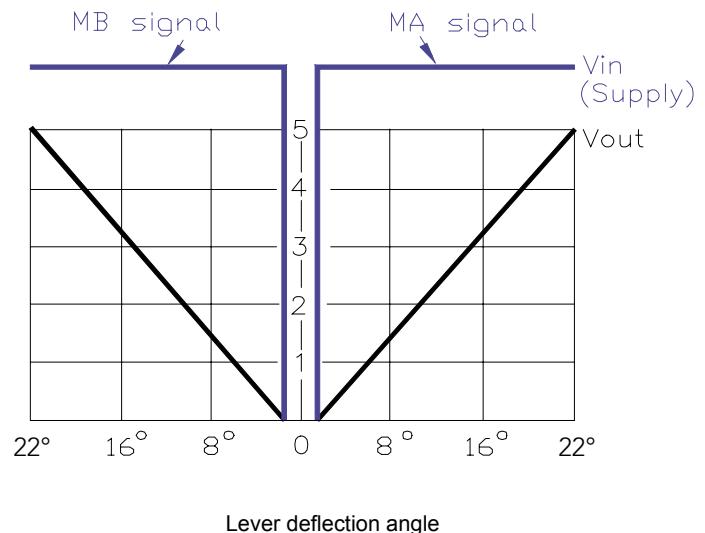
Center tap output signal with digital directional signals

Current consumption @ rest:	< 150 mA (without external load)
Supply voltage (Vin):	8÷32 VDC
Signal output @ rest:	0 V
Output signal range:	0÷5 V ± 0.2 V (see graph)
Rated output current:	1 mA

(MA and MB signals on graph)

Digital directional outputs on both axes:	0 / Vin (0.7 A max)
Digital directional outputs switching angle:	between 2° and 5°

OUTPUT SIGNAL CONTROL CHARACTERISTICS



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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

MLT VERSION

Adjustable output signal for closed loop proportional actuators

Supply voltage: 8÷32 VDC

Current consumption @ rest: 250 mA

Analog outputs: 5

Output signal range: linear signal (adjustable)

0.5÷4.5 V

0.9÷4.1 V

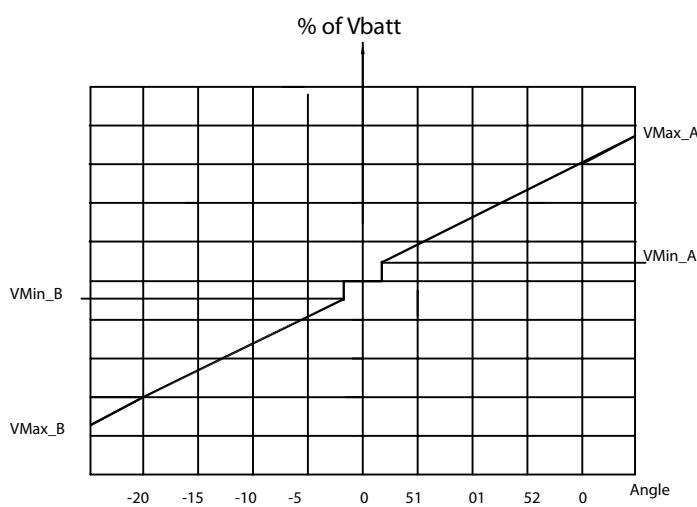
2.0÷6.0 V

Rated output current: 15 mA

Power digital outputs: 4 (0.7 A)

Adjustments: via RS232 serial line

OUTPUT SIGNAL CONTROL CURVE



ADJUSTABLE PARAMETERS

The following parameters are adjustable via RS232 serial line by means of a specific calibration and configuration tool.

By use of the configuration window:

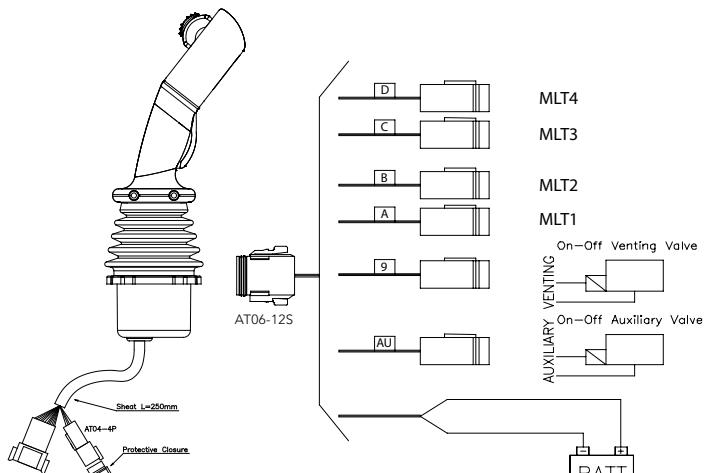
- Operation mode.
- Deadman push button enable.
- Joystick functions: axes reverse and enable, virtual cross movement.
- Assignment for on-off auxiliary outputs.

By use of the calibration window:

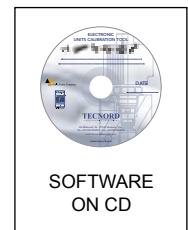
- Operating parameters: Vmin, Vmax, Ramp up, Ramp down.

APPLICATION EXAMPLE

Shown with MS grip



For PC connection (optional)
ordering code: 21.0801.055

SOFTWARE
ON CD

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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

RTM VERSION

Ratiometric adjustable output signal for closed loop proportional actuators

Supply voltage: 8÷32 VDC

Current consumption @ rest: 250 mA

Analog outputs: 5

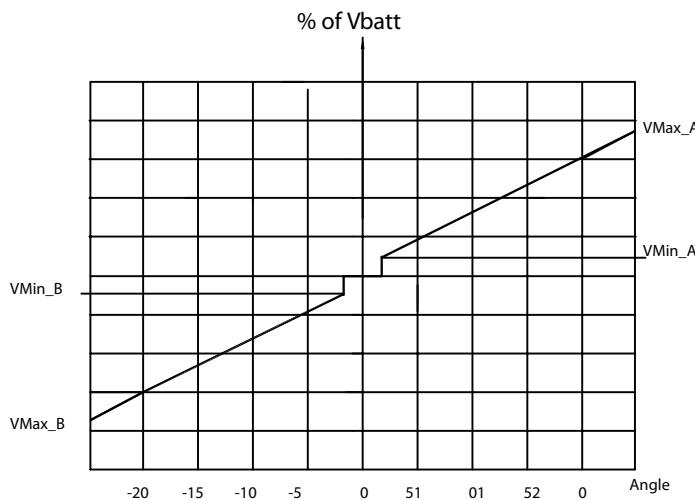
Output signal range: linear signal (adjustable)
25÷50÷75% of Vbatt
10÷50÷90% of Vbatt

Rated output current: 15 mA

Power digital outputs: 4 (0.7 A)

Adjustments: via RS232 serial line

OUTPUT SIGNAL CONTROL CURVE



ADJUSTABLE PARAMETERS

The following parameters are adjustable via RS232 serial line by means of a specific calibration and configuration tool.

By use of the configuration window:

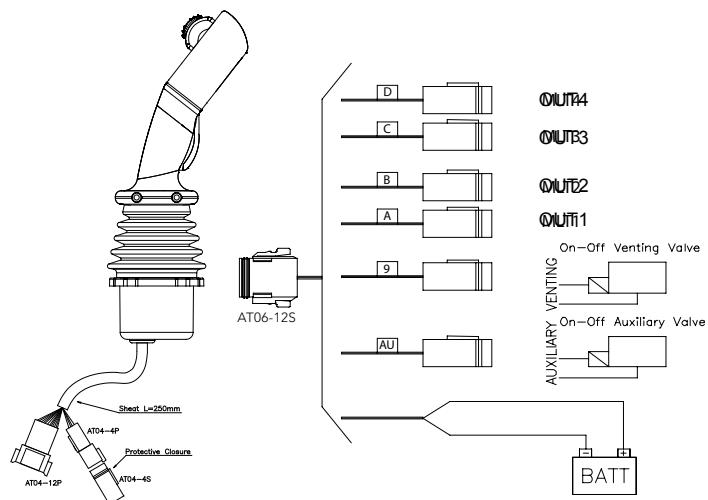
- Operation mode.
- Deadman push button enable.
- Joystick functions: axes reverse and enable, virtual cross movement.
- Output assignment on-off auxiliary valves.

By use of the calibration window:

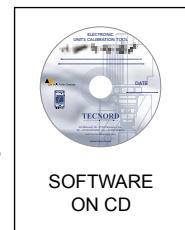
- Operating parameters: Vmin, Vmax, Ramp up, Ramp down.

APPLICATION EXAMPLE

Shown with MS grip



For PC connection (optional)
ordering code: 21.0801.055



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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

PWM VERSION

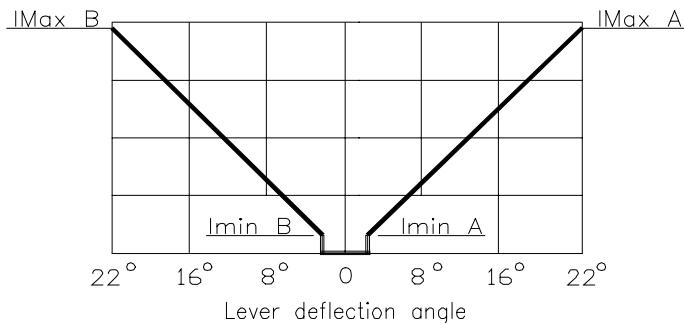
2 PWM output channels

Supply voltage:	8÷32 VDC
Current consumption @ rest:	250 mA
PWM output:	2 x dual proportional solenoid valves
Current output range (PWM):	100 to 1600 mA (3 A available on request)
Dither frequency:	60 to 250 Hz (100 Hz factory preset)
Adjustable ramp time:	0.05 to 5 s
Power digital outputs:	2 (3.5 A)
Adjustments:	via PC, RS232 serial line connection, using the Tecnord calibration and configuration tool (see picture below)

Notes:

- 1) 3rd axis available using FPR-PWM roller switch - $I_{max} = 1.5$ A
- 2) the base height is 60 mm instead of the standard 46 mm

OUTPUT SIGNAL CONTROL CURVE



ADJUSTABLE PARAMETERS

The following parameters are adjustable via RS232 serial line by means of the calibration/configuration tool.

By use of the configuration window:

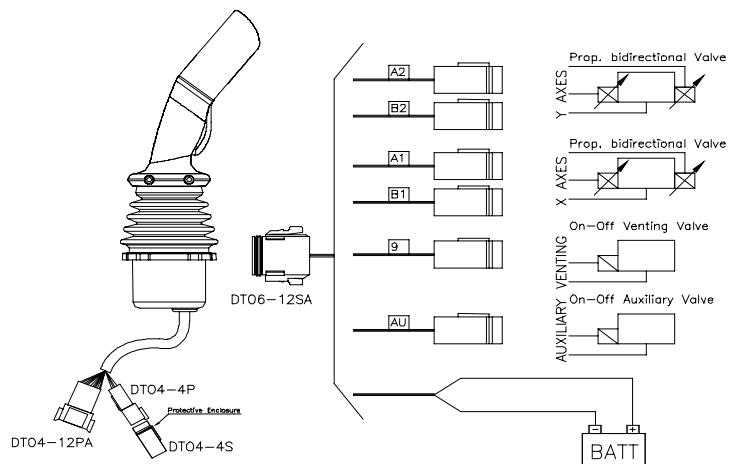
- Operation mode.
- Deadman push button enable.
- Joystick functions: axes reverse, virtual cross movement.
- Current setpoint selection (for 360° movement only).
- Output assignment on-off auxiliary valves.
- Digital directional output signals on both axes (N.O. or N.C. mode)

By use of the calibration window:

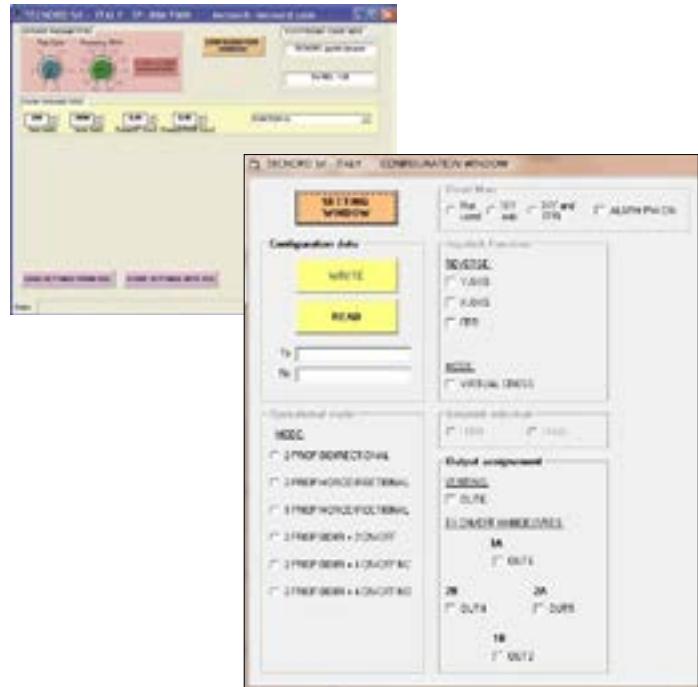
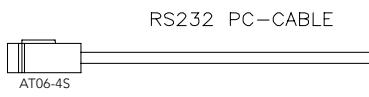
- Operating parameters: I_{min} , I_{max} , Ramp up and Ramp down times.

APPLICATION EXAMPLE

Shown with MS grip



For PC connection (optional)
ordering code: 21.0801.055



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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

TCN VERSION (special configuration of PWM version)

1 PWM output in combination with up to 5 on-off outputs

Supply voltage: 8÷32 VDC

Current consumption @ rest: < 250 mA

PWM output: 1 x single proportional solenoid valves

Current output range (PWM): 100 to 1600 mA (3A available on request)

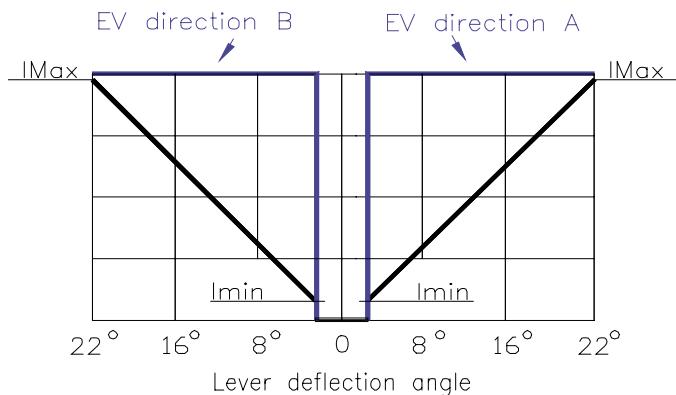
Dither frequency: 60 to 250 Hz (100 Hz factory preset)

Adjustable ramp time: 0.05 to 5 s

Power digital outputs: 5 (3.5 A)

Adjustments: via PC, RS232 serial line connection, using the Tecnord calibration and configuration tool (see picture below)

OUTPUT SIGNAL CONTROL CURVE



Imin and digital outputs activation: between 2° and 5°

ADJUSTABLE PARAMETERS

The following parameters are adjustable via RS232 serial line by means of a specific calibration and configuration tool.

By use of the configuration window:

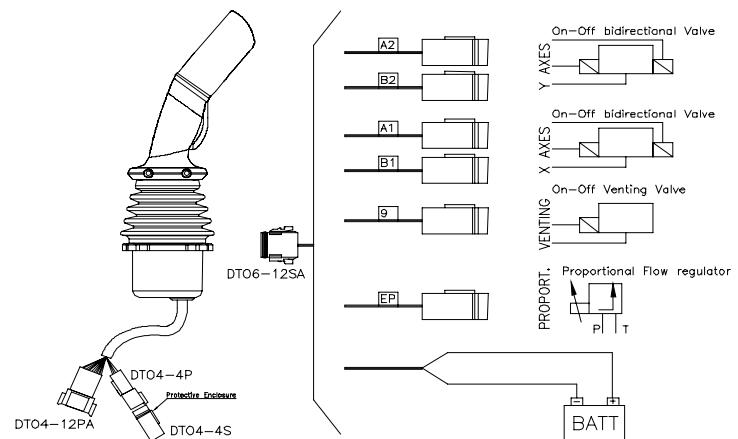
- Operation mode.
- Deadman push button enable.
- Joystick functions: axes reverse, virtual cross movement.
- Current setpoint selection (for 360° movement only).
- Output assignment on-off auxiliary valves.

By use of the calibration window:

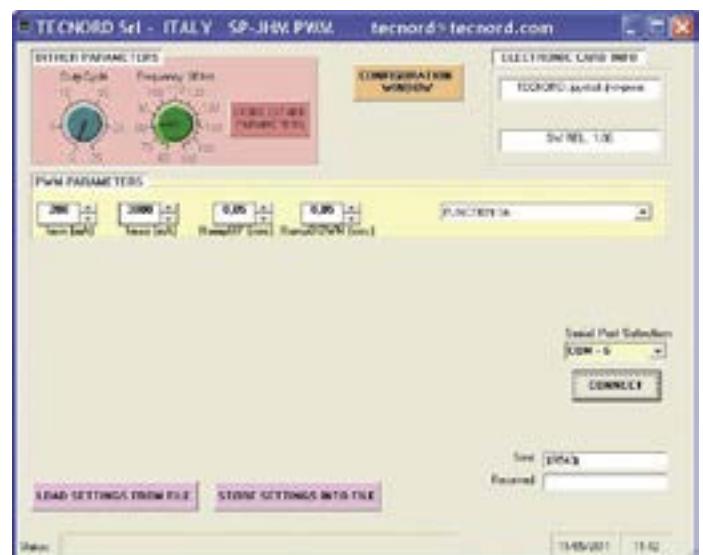
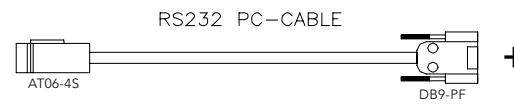
- Operating parameters: Imin, Imax, Ramps.

APPLICATION EXAMPLE

Shown with MS grip



For PC connection (optional)
ordering code: 21.0801.055



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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK (JOYSTICK BASE ONLY)

CANBUS VERSION

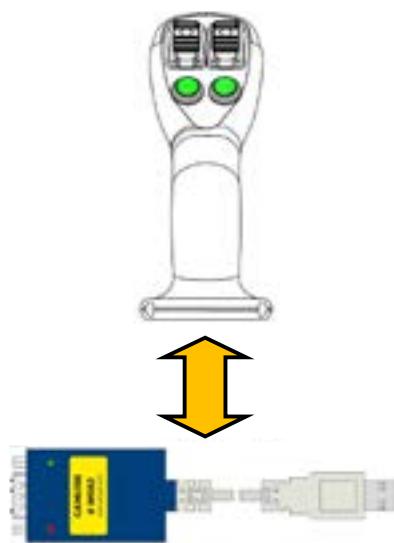
Supply voltage:	8÷32 VDC
Current consumption @ rest:	< 250 mA
Physical layer:	ISO 11898, 250 Kbit/s
Protocol:	J1939/ CANopen
Connector type:	Deutsch DT04-4P

With CANbus link, following signals can be managed on the multifunctional grip:

- 4 digital outputs 0.7A (LEDs, detent coils, buzzers, etc).
- 6 analog voltage input 0-5 V (proportional rollers and mini-joysticks).
- 6 digital inputs (push buttons, toggles, etc).

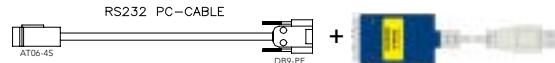
CONNECTIONS

Deutsch DT04-4P	
2	1 +V (POWER SUPPLY)
1	2 CAN - L
3	3 CAN - H
4	4 -V (POWER SUPPLY - GND)



CANOPEN VERSION ONLY

ordering code: 21.0801.083



ADJUSTABLE PARAMETERS

The following parameters are adjustable via CAN:

For CANopen version

- Node ID

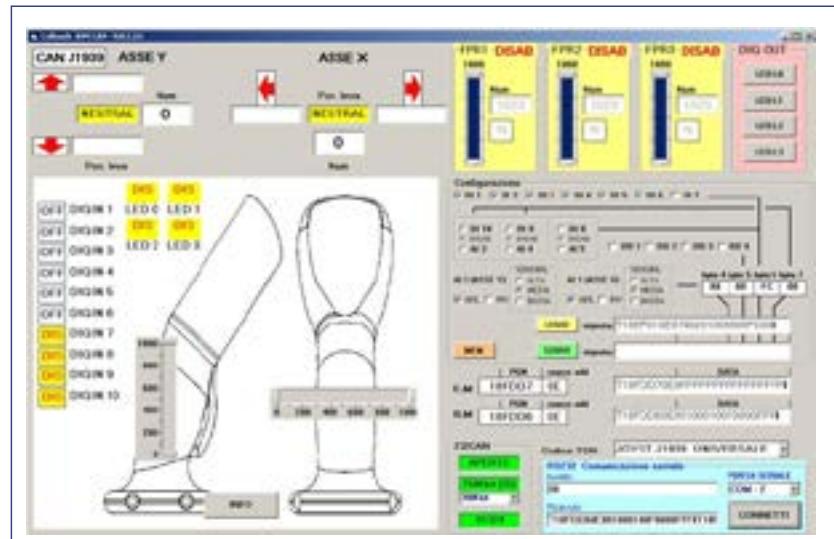
For J1939 version

- Node ID

In addition, with the specific "Calibration and Configuration PC Tool" and the CAN/USB hardware interface device (see picture below) is possible:

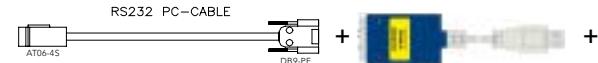
- Read joystick configuration
- Adjust X, Y axes sensibility and direction
- Enable /disable digital or analog inputs and digital outputs

FOR J1939 VERSION ONLY



J1939 VERSION ONLY

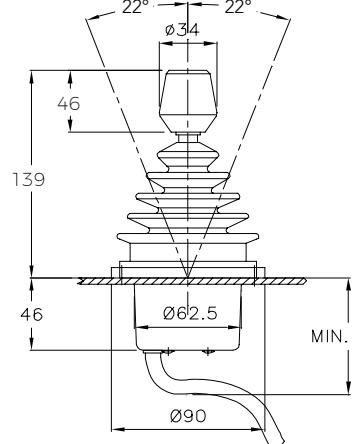
ordering code: 21.0801.062



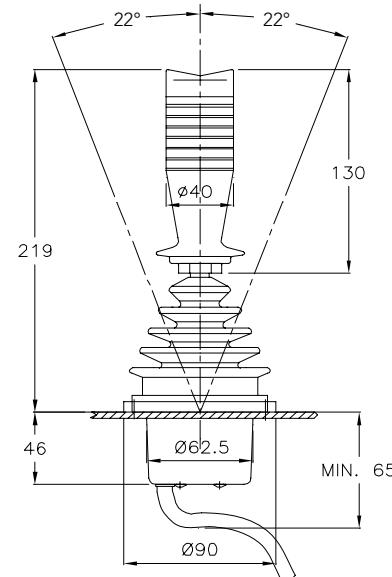
SOFTWARE
ON CD

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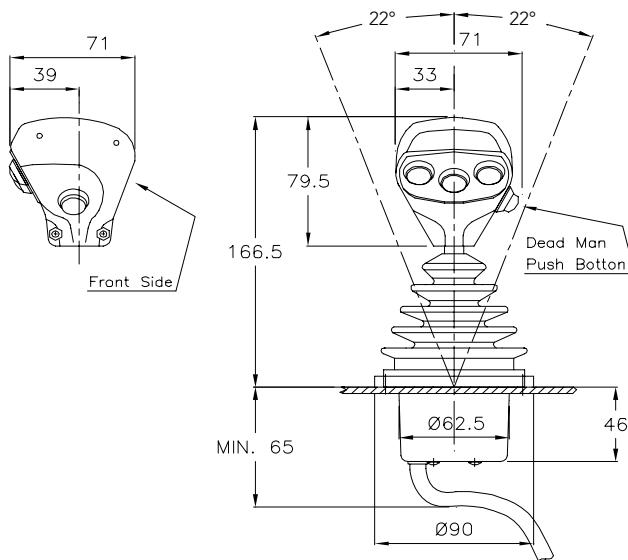
JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK

JHM joystick with grips - configuration examples with overall dimensions

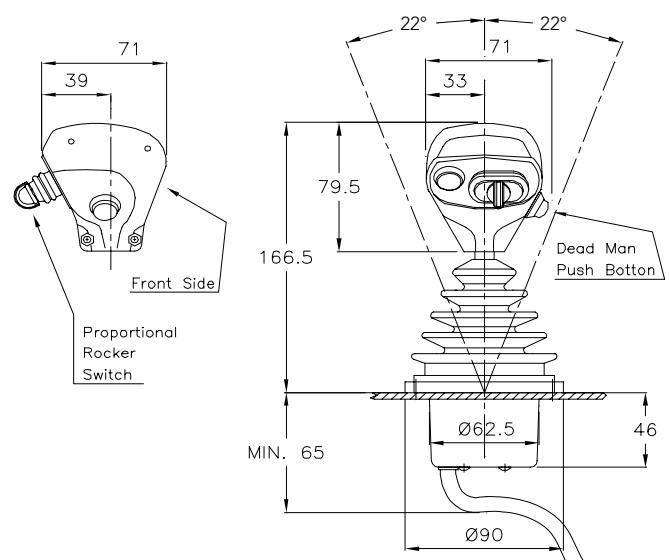
JHM base with IL handle
Complete code: **JHM-L4D/ANH-IL 0000**



JHM base with IC handle
Complete code: **JHM-L4D/ANH-IC 0200**



JHM base with IE type handle
Complete code: **JHM-L4D/ANH-IE A4P9 0000**



JHM base with IE type handle
Complete code: **JHM-L4D/ANH-IE A1P9 1PRS**

JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK

JHM joystick with grips - configuration examples with overall dimensions

JHM base with MS type handle
Complete code: **JHM L4D/ANH-MS A6P9 R3P9**



JHM base with MS type handle
Complete code: **JHM L4D/ANH-MS A2P9 2FPR R1P9**



JHM base with MG type handle
Complete code: **JHM L4D/ANH-MG A4P9 R1P9**

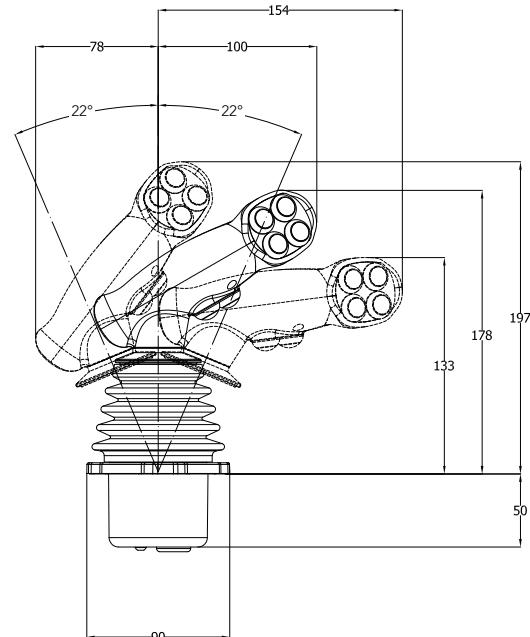


JHM base with MG type handle
Complete code: **JHM L4D/ANH-MG A2P9 1FPR 0000**

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JHM HEAVY DUTY MULTI-AXIS HALL EFFECT JOYSTICK**JHM joystick with HL – HR grips - configuration examples with overall dimensions**

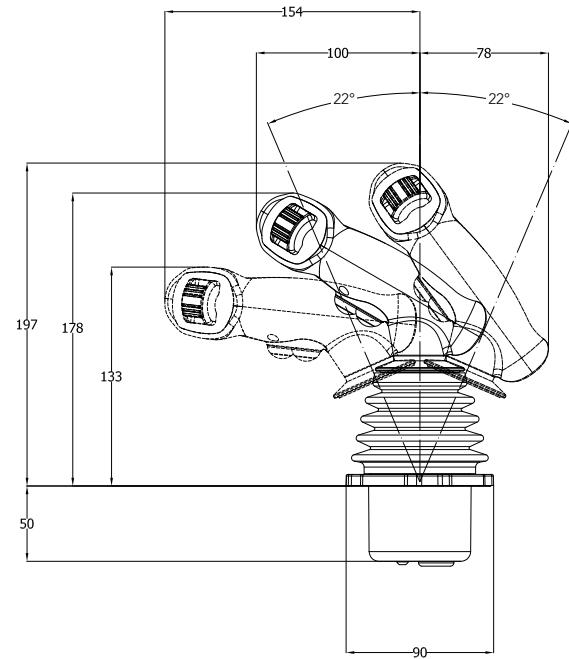
JHM base with HL type handle
Complete code: **JHM-L4D/ANH-HL-04P9-2P9/RDFF**



JHM base with HL type handle
Complete code: **JHM-L4D/ANH-HL-04P9-2P9/RDFF**



JHM base with HR type handle
Complete code: **JHM-L4C/NN-HR-0FPR-2P9/R000**



JHM base with HR type handle
Complete code: **JHM-L4C/NN-HR-0FPR-2P9/R000**

ERGONOMIC GRIPS

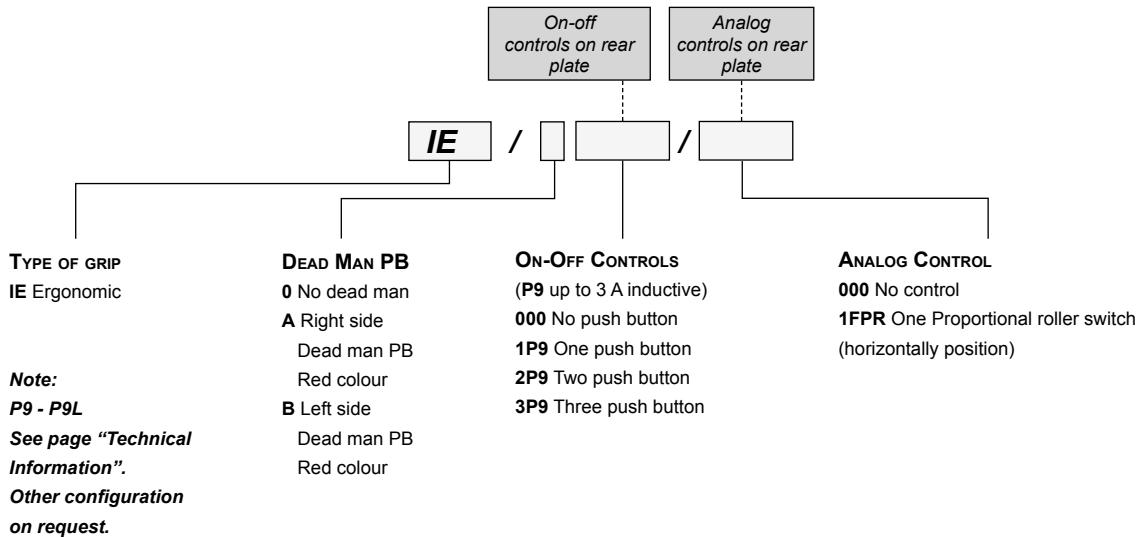
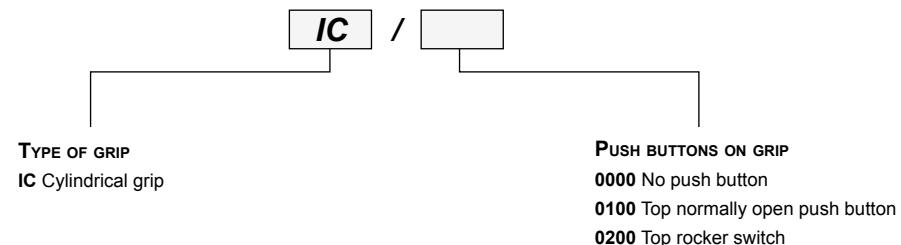
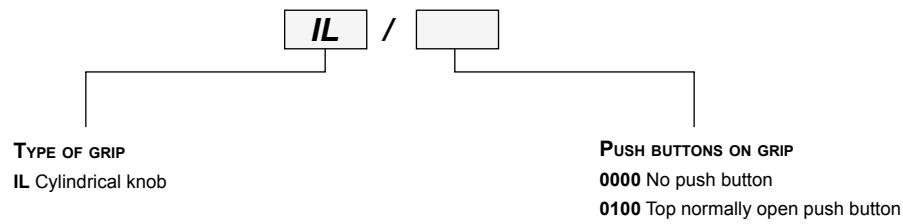
DESCRIPTION	ORDERING INFORMATION PAGE	TECHNICAL INFORMATION PAGE
IL cylindrical knob IC cylindrical	JK41	JK45
IE ergonomic, gear type, multi-functions	JK41	JK46
HL multi-function ergonomic left hand grip	JK42	JK47-48
HR multi-function ergonomic right hand grip	JK42	JK49-50
MS ergonomic, symmetric, multi-functions	JK44	JK51-53
MG ergonomic, right hand, multi-functions	JK44	JK54-56

Note: 1) Ergonomic grips can be used as stand alone devices.
 2) Grips do not include rubber gaiter and retainer ring, which must be ordered separately.

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IL / IC / IE GRIPS

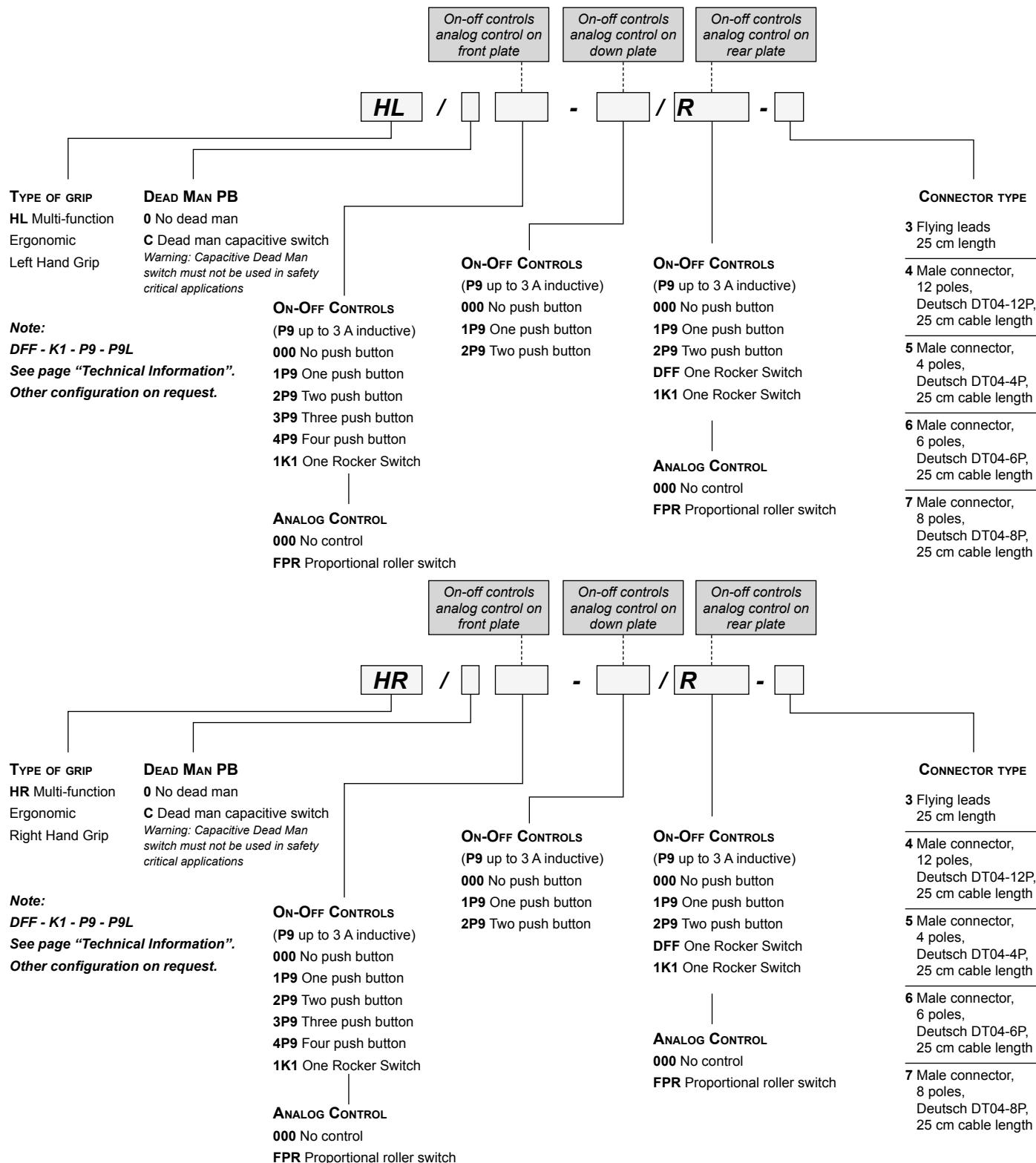
ORDERING INFORMATION



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HL / HR ERGONOMIC GRIP

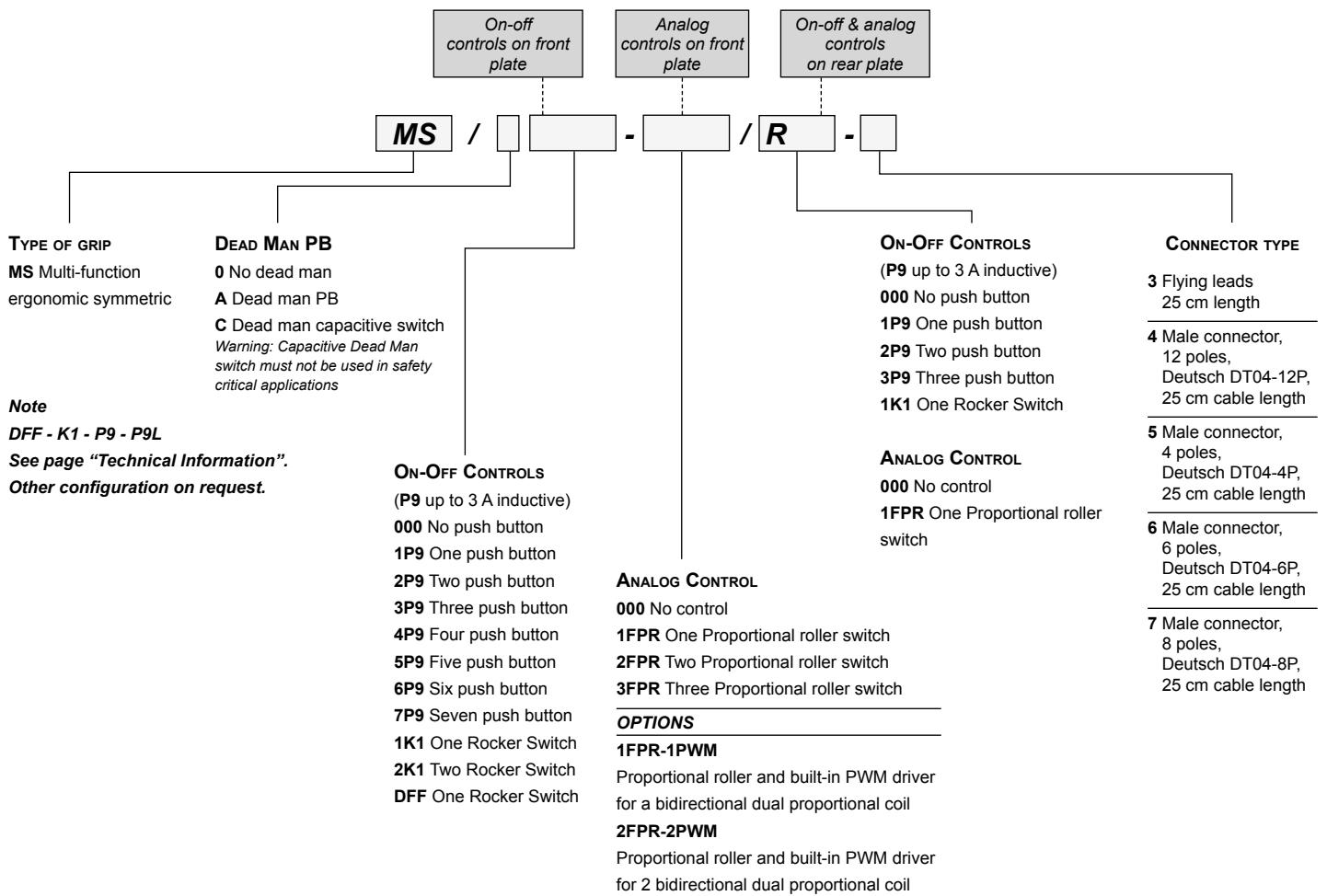
ORDERING INFORMATION



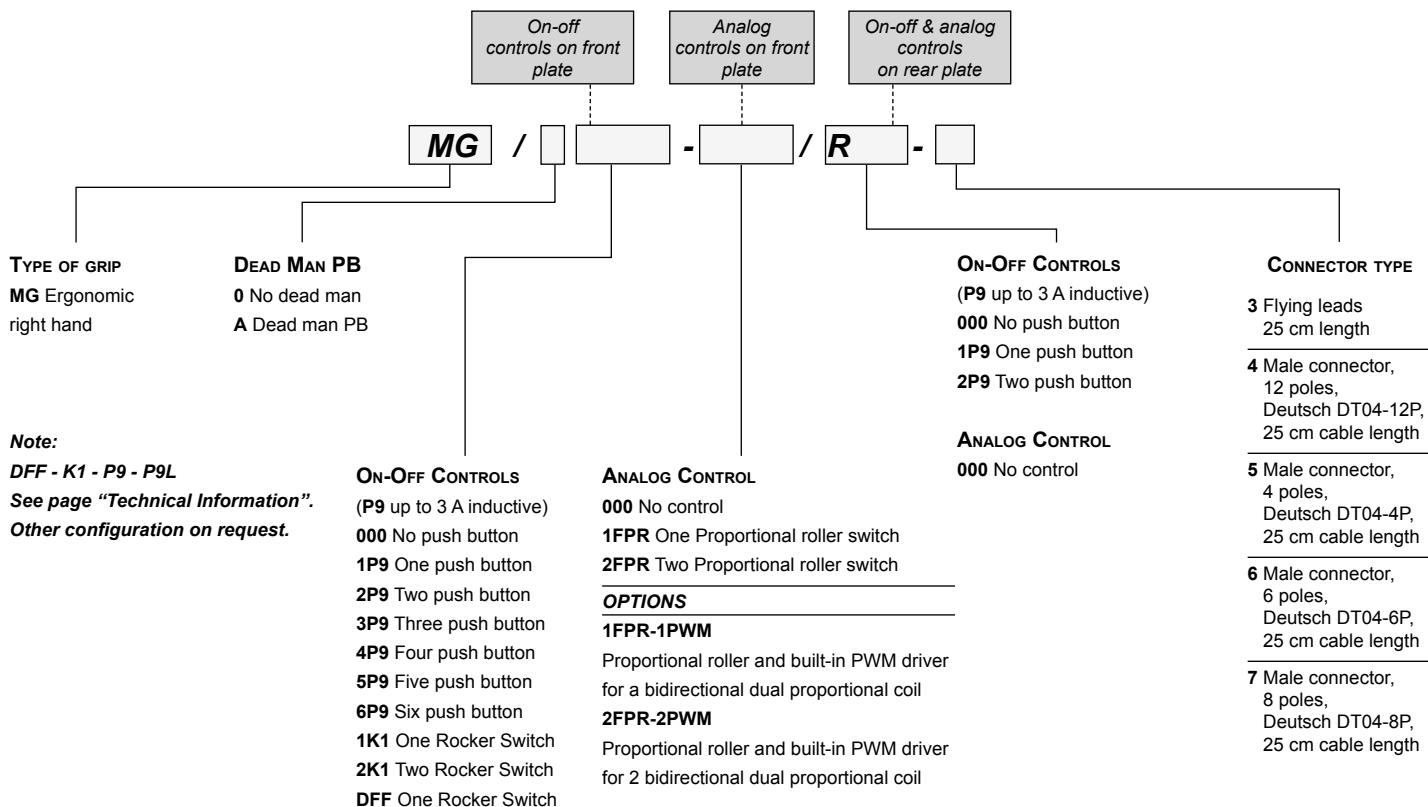
WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

MS ERGONOMIC SYMMETRIC GRIP

ORDERING INFORMATION



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IL - IC GRIPS

IL - CYLINDRICAL KNOB

MECHANICAL SPECIFICATIONS

Body material:	Thermoplastic elastomer
Colour:	black
Operating temperature range:	-20°C / +60°C
Connecting hub:	female thread / M14 x 1.5

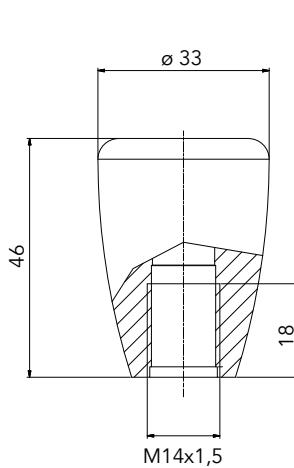
ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Insulating cable material:	PVC

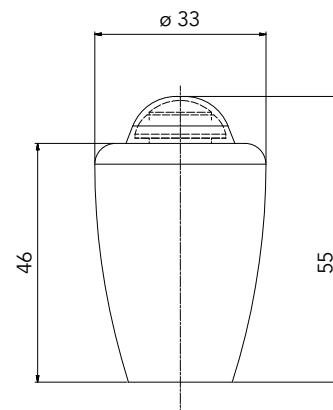
TOP PUSH BUTTON

Rated amperage:	3 A inductive
Life:	> 100.000 cycles
Protection class:	IP 64

OVERALL DIMENSIONS



IL-0000
No push button



IL-0100
Top push button
(No circuit)

IC - CYLINDRICAL GRIP

MECHANICAL SPECIFICATIONS

Body material:	nylon
Bottom rubber material:	neoprene
Colour:	black
Operating temperature range:	-20°C / +60°C
Connecting hub:	female thread / M14 x 1.5

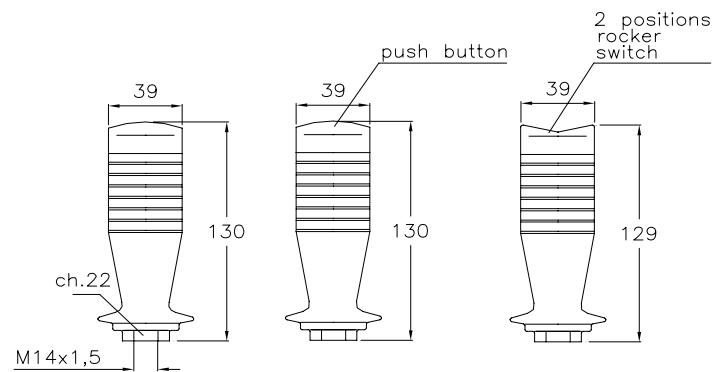
ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Insulating cable material:	PVC

PUSH BUTTON AND ROCKER SWITCH

Contacts:	silver plated
Rated amperage:	16 A / 250 vac 3 A / 24 VDC
Electrical life:	> 100.000 cycles
Mechanical life:	> 3.000.000 cycles
Protection class:	IP 54

OVERALL DIMENSIONS



IC-0000
No push button

IC-0100
Top push button
(No circuit)

IC-0200
Top rocker switch

IL - IC ORDERING INFORMATION: see page JK39

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

IE MULTI-FUNCTION ERGONOMIC GRIP**FEATURES**

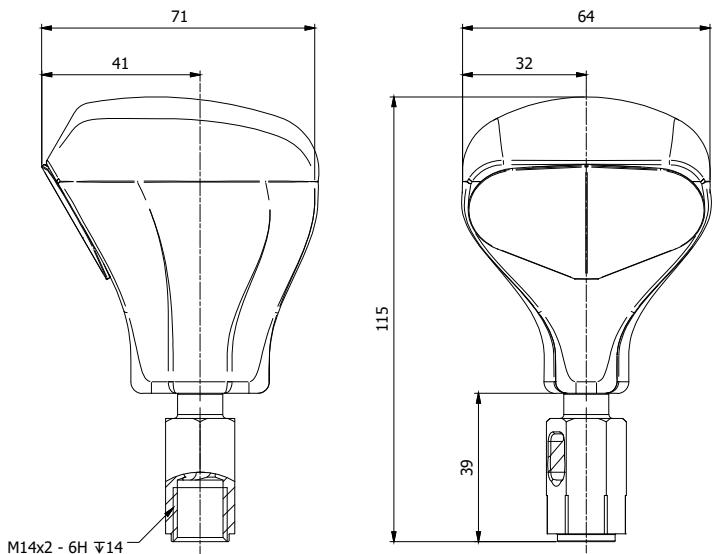
- Multi-functions ergonomic grip gear type with on-off and proportional switches.
- Easy adaptability to existing joystick control lever.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Connecting hub:	female thread / M14 x 1.5
Protection class:	IP 65 (plain grip)

**ELECTRICAL SPECIFICATIONS**

Prewired exit cable:	250 mm
Available push buttons and switches	
P9 - P9L - Push buttons:	see page JK61 Technical Information
A - Side dead man push button:	see above specifications for P9 push button
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS**CONFIGURATION EXAMPLES**

	D-man P/B	Rear P/B	Rear FPR
IE/0000/0000	0	0	0
IE/A000/0000	yes	0	0
IE/A1P9/0000	yes	1xP9	0
IE/A2P9/0000	yes	2xP9	0
IE/A3P9/0000	yes	3xP9	0
IE/0000/1FPR	0	0	1xFPR
IE-A1P9-1FPR	yes	1xP9	1xFPR

IE ORDERING INFORMATION: see page JK39

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

HL MULTI-FUNCTION ERGONOMIC LEFT HAND GRIP**FEATURES**

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request)
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

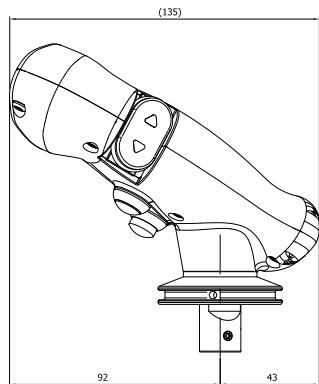
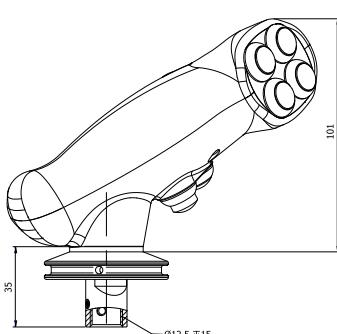
Prewired exit cable:	250 mm
----------------------	--------

Available push buttons and switches

C - Dead man capacitive switch	
SPST contact, Normally Open Contact rating 1A	
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
HL/04P9-2P9/RDFF



HL ORDERING INFORMATION: see page JK40



FRONT VIEW - LEFT HAND

CONFIGURATION EXAMPLES

	FRONT P/B	BOTTOM P/B	REAR P/B
HL/0000-000/R000	0	0	0
HL/01P9-000/R000	1xP9	0	0
HL/02P9-000/R000	2xP9	0	0
HL/03P9-000/R000	3xP9	0	0
HL/04P9-000/R000	4xP9	0	0
HL/04P9-1P9/R000	4xP9	1xP9	0
HL/04P9-2P9/R000	4xP9	2xP9	0
HL/04P9-2P9/R1P9	4xP9	2xP9	1xP9
HL/04P9-2P9/R2P9	4xP9	2xP9	2xP9
HL/0FPR-000/R000	1xFPR	0	0
HL/0000-000/RFPR	0	0	1xFPR
HL/0FPR-000/RFPR	1xFPR	0	1xFPR
HL/01K1-000/R000	1xK1	0	0
HL/0000-000/R1K1	0	0	1xK1
HL/01K1-000/R1K1	1xK1	0	1xK1
HL/0DFF-000/R000	1xDFF	0	0
HL/0000-000/RDFF	0	0	1xDFF
HL/0DFF-000/RDFF	1xDFF	0	1xDFF

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

HL MULTI-FUNCTION ERGONOMIC LEFT HAND GRIP

FEATURES

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request)
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

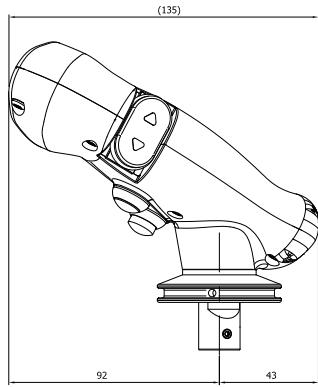
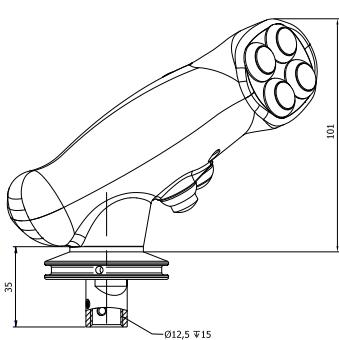
Prewired exit cable:	250 mm
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Available push buttons and switches

C - Dead man capacitive switch	
SPST contact, Normally Open Contact rating 1A	
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
HL/04P9-2P9/RDFF



REAR VIEW - LEFT HAND

CONFIGURATION EXAMPLES

	FRONT P/B	BOTTOM P/B	REAR P/B
HL/0000-000/R000	0	0	0
HL/0FPR-000/R000	1xFPR	0	0
HL/0FPR-1P9/R000	1xFPR	1xP9	0
HL/0FPR-2P9/R000	1xFPR	2xP9	0
HL/0FPR-2P9/R1P9	1xFPR	2xP9	1xP9
HL/0FPR-2P9/R2P9	1xFPR	2xP9	2xP9
HL/0FPR-000/R1FPR	1xFPR	0	1xFPR
HL/0FPR-1P9/R1FPR	1xFPR	1xP9	1xFPR
HL/0FPR-2P9/R1FPR	1xFPR	2xP9	1xFPR

HL ORDERING INFORMATION: see page JK40

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

HR MULTI-FUNCTION ERGONOMIC RIGHT HAND GRIP

FEATURES

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

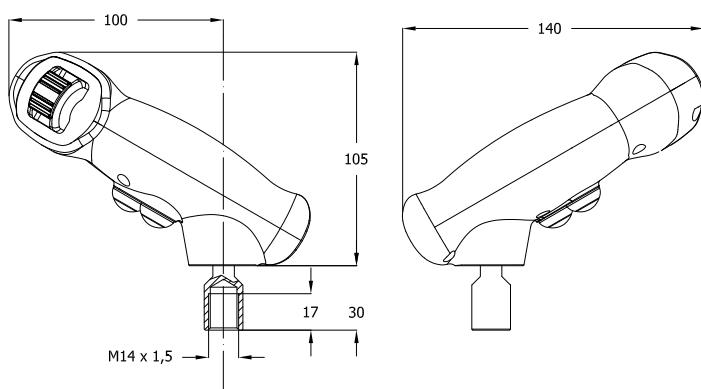
Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request)
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Available push buttons and switches	
C - Dead man capacitive switch	
SPST contact, Normally Open Contact rating 1A	
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
HR/1FPR-2P9/R000



HR ORDERING INFORMATION: see page JK40



FRONT VIEW - RIGHT HAND

CONFIGURATION EXAMPLES

	FRONT P/B	BOTTOM P/B	REAR P/B
HR/0000-000/R000	0	0	0
HR/01P9-000/R000	1xP9	0	0
HR/02P9-000/R000	2xP9	0	0
HR/03P9-000/R000	3xP9	0	0
HR/04P9-000/R000	4xP9	0	0
HR/04P9-1P9/R000	4xP9	1xP9	0
HR/04P9-2P9/R000	4xP9	2xP9	0
HR/04P9-2P9/R1P9	4xP9	2xP9	1xP9
HR/04P9-2P9/R2P9	4xP9	2xP9	2xP9
HR/0FPR-000/R000	1xFPR	0	0
HR/0000-000/RFPR	0	0	1xFPR
HR/0FPR-000/RFPR	1xFPR	0	1xFPR
HR/01K1-000/R000	1xK1	0	0
HR/0000-000/R1K1	0	0	1xK1
HR/01K1-000/R1K1	1xK1	0	1xK1
HR/0DFF-000/R000	1xDFF	0	0
HR/0000-000/RDFF	0	0	1xDFF
HR/0DFF-000/RDFF	1xDFF	0	1xDFF

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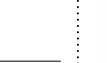
HR MULTI-FUNCTION ERGONOMIC RIGHT HAND GRIP**FEATURES**

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

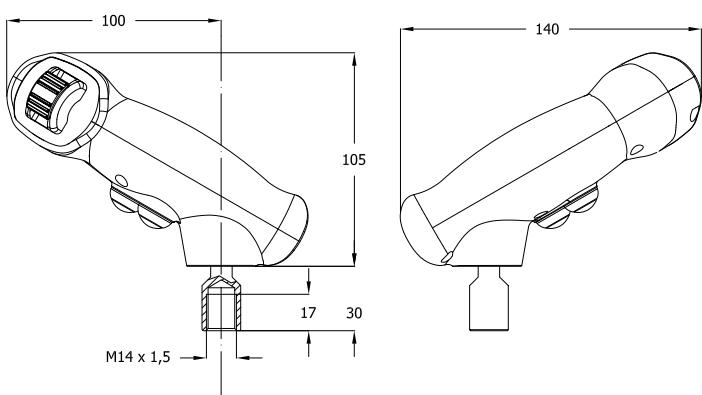
Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request)
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Available push buttons and switches	
C - Dead man capacitive switch	
SPST contact, Normally Open Contact rating 1A	
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
HR/1FPR-2P9/R000



REAR VIEW - RIGHT HAND

CONFIGURATION EXAMPLES

	FRONT P/B	BOTTOM P/B	REAR P/B
HR/0000-000/R000	0	0	0
HR/0FPR-000/R000	1xFPR	0	0
HR/0FPR-1P9/R000	1xFPR	1xP9	0
HR/0FPR-2P9/R000	1xFPR	2xP9	0
HR/0FPR-2P9/R1P9	1xFPR	2xP9	1xP9
HR/0FPR-2P9/R2P9	1xFPR	2xP9	2xP9
HR/0FPR-000/R1FPR	1xFPR	0	1xFPR
HR/0FPR-1P9/R1FPR	1xFPR	1xP9	1xFPR
HR/0FPR-2P9/R1FPR	1xFPR	2xP9	1xFPR

HR ORDERING INFORMATION: see page JK40

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

MS MULTI-FUNCTION ERGONOMIC SYMMETRIC GRIP**FEATURES**

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
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Available push buttons and switches

A - Dead man push button

Rated amperage: up to 3 A inductive

Protection class (microswitch): IP 67

C - Dead man capacitive switch

SPST contact, Normally Open Contact rating 1A

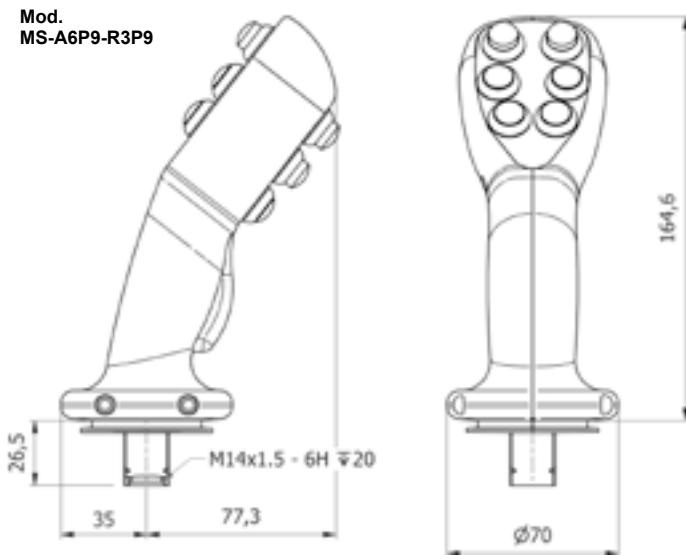


DFF - Rocker Switch: see page JK60 Technical Info

K1 - Rocker Switch: see page JK60 Technical Info

P9 - P9L - Push buttons: see page JK61 Technical Info

FPR - Proportional roller: see FPR data sheet

Output signal: 3-pins connection
hall effect contactless sensor**OVERALL DIMENSIONS**Mod.
MS-A6P9-R3P9**CONFIGURATION EXAMPLES**

	D-man P/B	Front P/B	Rear P/B
MS/0000/0000	0	0	
MS/A000/0000/0000	yes	0	
MS/A1P9/0000/0000	yes	1xP9	
MS/A2P9/0000/0000	yes	2xP9	
MS/A3P9/0000/0000	yes	3xP9	
MS/A4P9/0000/0000	yes	4xP9	
MS/A5P9/0000/0000	yes	5xP9	
MS/A6P9/0000/0000	yes	6xP9	
MS/A6P9/0000/R1P9	yes	6xP9	1xP9
MS/A6P9/0000/R2P9	yes	6xP9	2xP9
MS/A6P9/0000/R3P9	yes	6xP9	3xP9

MS ORDERING INFORMATION: see page JK41

MS MULTI-FUNCTION ERGONOMIC SYMMETRIC GRIP

FEATURES

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

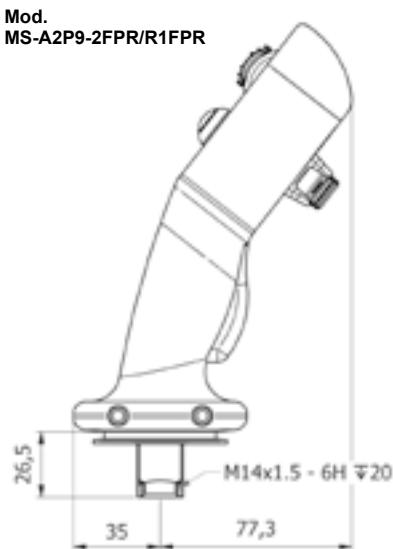
ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
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Available push buttons and switches

A - Dead man push button	
Rated amperage:	up to 3 A inductive
Protection class (microswitch):	IP 67
C - Dead man capacitive switch	
SPST contact, Normally Open Contact rating 1A	
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK61 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS



CONFIGURATION EXAMPLES

	D-man P/B	Front P/B	Front FPR	Rear P/B	Rear FPR
MS/01P9/1FPR/0000	0	1xP9	1xFPR		
MS/A2P9/1FPR/0000	yes	2xP9	1xFPR		
MS/A3P9/1FPR/R1P9	yes	3xP9	1xFPR	1xP9	
MS/A4P9/1FPR/R2P9	yes	4xP9	1xFPR	2xP9	
MS/A4P9/1FPR/R1FPR	yes	4xP9	1xFPR		1xFPR
MS/A4P9/1FPR/R1FPR-2P9	yes	4xP9	1xFPR	2xP9	1xFPR
MS/A2P9/2FPR/0000	yes	2xP9	2xFPR	0	
MS/A2P9/2FPR/R1P9	yes	2xP9	2xFPR	1xP9	
MS/A2P9/2FPR/R2P9	yes	2xP9	2xFPR	2xP9	
MS/A2P9/2FPR/R1FPR-1P9	yes	2xP9	2xFPR	1xP9	1xFPR
MS/A2P9/2FPR/R1FPR-2P9	yes	2xP9	2xFPR	2xP9	1xFPR
MS/A000/3FPR/0000	yes	0	3xFPR	0	
MS/A000/3FPR/R1P9	yes	0	3xFPR	1xP9	
MS/A000/3FPR/R2P9	yes	0	3xFPR	2xP9	

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MS MULTI-FUNCTION ERGONOMIC SYMMETRIC GRIP**FEATURES**

- Optimum ergonomic design.
- Internal PWM driver.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

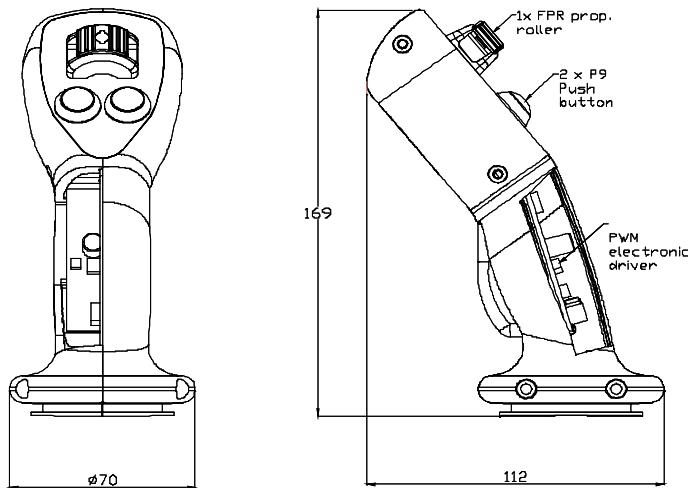
Prewired exit cable:	250 mm
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Available push buttons and switches

A - Dead man push button	
Rated amperage:	up to 3 A inductive
Protection class (microswitch):	IP 67
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
MS-A2P9-1FPR-1PWM

**PWM - Pulse width modulated output current driver
for a dual coil proportional valve**

Supply voltage:	8-32 Volt
Max. current draw:	100 mA
Current output range:	factory set btw 0 and 1500 mA
PWM dither frequency:	100 Hz
Operating temperature range:	-25°C / +85°C

CONFIGURATION EXAMPLES

	D-man P/B	Front P/B	Front FPR
MS/01P9/1FPR/1PWM	0	1xP9	1xFPR
MS/A2P9/1FPR/1PWM	yes	2xP9	1xFPR
MS/A3P9/1FPR/1PWM	yes	3xP9	1xFPR
MS/A4P9/1FPR/1PWM	yes	4xP9	1xFPR

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

MG MULTI-FUNCTION ERGONOMIC RIGHT HAND GRIP

FEATURES

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

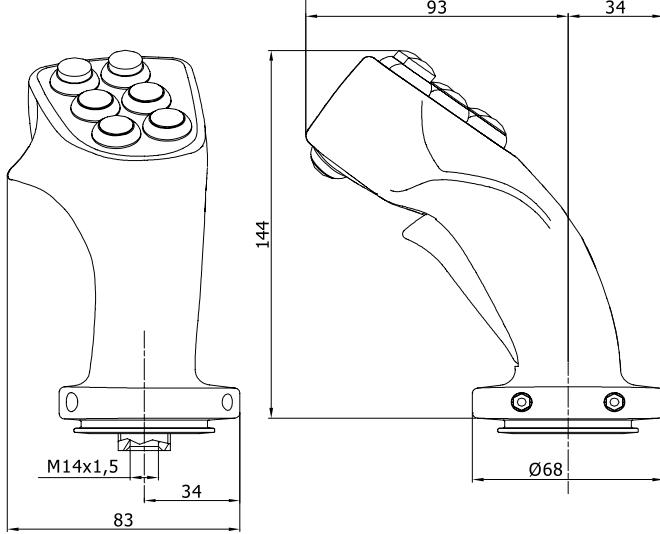


ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Available push buttons and switches	
A - Dead man push button	
Rated amperage:	up to 3 A inductive
Protection class (microswitch):	IP 67
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
MG-A6P9-R3P9



CONFIGURATION EXAMPLES

	D-man P/B	Front P/B	Rear P/B
MG/0000/0000	0	0	
MG/A000/0000/0000	yes	0	
MG/A1P9/0000/0000	yes	1xP9	
MG/A2P9/0000/0000	yes	2xP9	
MG/A3P9/0000/0000	yes	3xP9	
MG/A4P9/0000/0000	yes	4xP9	
MG/A5P9/0000/0000	yes	5xP9	
MG/A6P9/0000/0000	yes	6xP9	
MG/A6P9/0000/R1P9	yes	6xP9	1xP9
MG/A6P9/0000/R2P9	yes	6xP9	2xP9
MG/A6P9/0000/R3P9	yes	6xP9	3xP9

MG ORDERING INFORMATION: see page JK42

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MG MULTI-FUNCTION ERGONOMIC RIGHT HAND GRIP

FEATURES

- Optimum ergonomic design.
- High performance switches.

MECHANICAL SPECIFICATIONS

Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

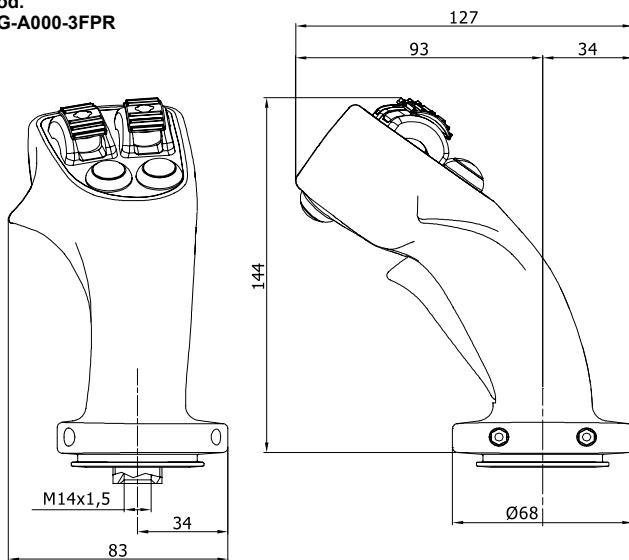
Prewired exit cable:	250 mm
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Available push buttons and switches

A - Dead man push button	
Rated amperage:	up to 3 A inductive
Protection class (microswitch):	IP 67
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
MG-A000-3FPR



CONFIGURATION EXAMPLES

	D-man P/B	Front P/B	Front FPR	Rear P/B	Rear FPR
MG/01P9/1FPR/0000	0	1xP9	1xFPR		
MG/A2P9/1FPR/0000	yes	2xP9	1xFPR		
MG/A3P9/1FPR/R1P9	yes	3xP9	1xFPR	1xP9	
MG/A4P9/1FPR/R2P9	yes	4xP9	1xFPR	2xP9	
MG/A2P9/2FPR/0000	yes	2xP9	2xFPR	0	
MG/A2P9/2FPR/R1P9	yes	2xP9	2xFPR	1xP9	
MG/A2P9/2FPR/R2P9	yes	2xP9	2xFPR	2xP9	
MG/A000/3FPR/0000	yes	0	3xFPR	0	
MG/A000/3FPR/R1P9	yes	0	3xFPR	1xP9	
MG/A000/3FPR/R2P9	yes	0	3xFPR	2xP9	

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MG MULTI-FUNCTION ERGONOMIC RIGHT HAND GRIP**FEATURES**

- Optimum ergonomic design.
- Internal PWM driver.

MECHANICAL SPECIFICATIONS

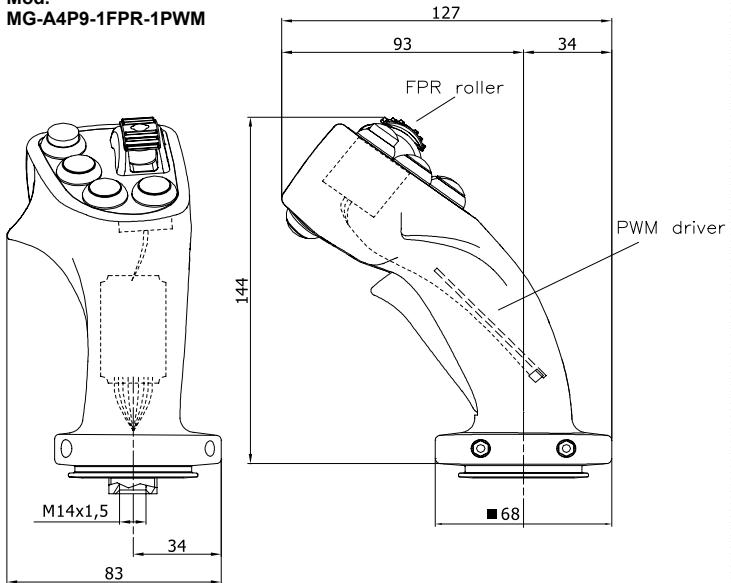
Material:	thermoplastic
Colour:	black
Operating temperature range:	-25°C / +85°C
Protection class:	IP 65 with plain grip (IP 67 with special assembly on request) IP 54 with dead man trigger option
Connecting hub:	female thread / M14 x 1.5

ELECTRICAL SPECIFICATIONS

Prewired exit cable:	250 mm
Available push buttons and switches	
A - Dead man push button	
Rated amperage:	up to 3 A inductive
Protection class (microswitch):	IP 67
DFF - Rocker Switch:	see page JK60 Technical Info
K1 - Rocker Switch:	see page JK60 Technical Info
P9 - P9L - Push buttons:	see page JK61 Technical Info
FPR - Proportional roller:	see FPR data sheet
Output signal:	3-pins connection hall effect contactless sensor

OVERALL DIMENSIONS

Mod.
MG-A4P9/1FPR-1PWM

**PWM - Pulse width modulated output current driver
for a dual coil proportional valve**

Supply voltage:	8-32 Volt
Max. current draw:	100 mA
Current output range:	factory set btw 0 and 1500 mA
PWM dither frequency:	100 Hz
Operating temperature range:	-25°C / +85°C

CONFIGURATION EXAMPLES

	D-man P/B	Front P/B	Front FPR	PWM	Rear P/B
MG/01P9/1FPR/1PWM	0	1xP9	1xFPR	1xPWM	
MG/A2P9/1FPR/1PWM	yes	2xP9	1xFPR	1xPWM	
MG/A3P9/1FPR/1PWM	yes	3xP9	1xFPR	1xPWM	
MG/A4P9/1FPR/1PWM	yes	4xP9	1xFPR	1xPWM	
MG/A4P9/1FPR/1PWM/R1P9	yes	4xP9	1xFPR	1xPWM	1xP9
MG/A4P9/1FPR/1PWM/R2P9	yes	4xP9	1xFPR	1xPWM	2xP9

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ACCESSORIES

MODEL	DESCRIPTION	PAGE
Joystick connections	Connector kits	JK58-59
Joystick calibration tool	Software calibration tool linking cables	JK60-61
Technical informations Operators for Grip Assembling	Rocker switches, push buttons knob potentiometer	JK62-64

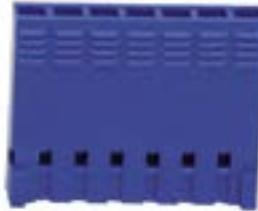
CONNECTOR KITS

7 POLES DUBOX CONNECTOR

Kit includes: male connector, female contacts

Available for joystick: JLP-L2S

ORDERING CODE: **13.0310.046**

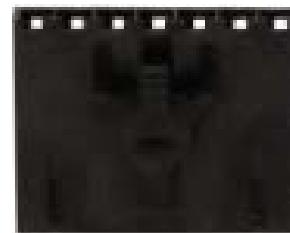


7 POLES C-GRID CONNECTOR

Kit includes: male connector, female contacts

Available for joystick: JLP-L2S, FTH

ORDERING CODE: **13.0310.591**



7 POLES DUBOX CONNECTOR WITH WIRES

Kit includes: male connector, with inserted wires section 0.22 mm²

Available for joystick: JLP-L2S

3 wires 80 cm length

ORDERING CODE: **13.0310.206**

7 wires 150 cm length

ORDERING CODE: **13.0310.313**



4 POLES MINIFIT CONNECTOR

Kit includes: male connector, female contacts

Available for joystick: FPR

ORDERING CODE: **13.0310.640**



6 POLES MINIFIT CONNECTOR

Kit includes: male connector, female contacts

Available for joystick: FPR-PWM

ORDERING CODE: **13.0310.654**



WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

CONNECTOR KITS

3 POLES DEUTSCH DT06-3S**Kit includes:** male connector, female contacts, secondary lock**Available for joystick:** FPR

ORDERING CODE: 13.0310.394

**4 POLES DEUTSCH DT06-4S****Kit includes:** male connector, female contacts, secondary lock**Available for joystick:** JHM-CAN

ORDERING CODE: 13.0310.132

**6 POLES DEUTSCH DT06-6S****Kit includes:** male connector, female contacts, secondary lock and fillers**Available for joystick:** JHM

ORDERING CODE: 13.0310.467

**8 POLES DEUTSCH DT06-8S****Kit includes:** male connector, female contacts, secondary lock and fillers**Available for joystick:** JHM

ORDERING CODE: 13.0310.432

**12 POLES DEUTSCH DT06-12S****Kit includes:** male connector, female contacts, secondary lock and fillers**Available for joystick:** JHM

ORDERING CODE: 13.0310.441



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CALIBRATION TOOL

CALIBRATION TOOL FOR TECNORD JOYSTICKS

Joysticks are supplied with standard operation parameters, which satisfies most applications. For customized applications, the calibration software allows the tuning of the parameters for proportional solenoid valves to be modified via computer; for example the minimum and maximum current or ramp up and down times may be defined. The linking cable shown in the following page (optional, to be ordered separately) is necessary for the computer connection.



CUSTOMER'S AREA



DOWNLOAD SOFTWARE



CALIBRATION INTERFACE



CAN-USB CONVERTER



JOYSTICK

CONNECTIONS

- **RS232 serial** an USB-RS232 converter is recommended
- **CANBus** an CAN-USB converter is recommended

PROGRAM INSTALLATION

To install the calibration software onto a personal computer, simply execute the setup.exe file previously downloaded from the Customers' area of the Tecnord web site (login necessary).

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CALIBRATION LINKING CABLES**JHM-PWM, JHM-MLT - SOFTWARE CALIBRATION TOOL**

With Deutsch-DB9 linking cable.

Available for joysticks: JHM-PWM, JHM-MLT

 ORDERING CODE: **21.0801.055**

**RS232 - USB CONVERTER**

It allows Tecnord joysticks to Personal Computer connection when the latter is unprovided of serial port; for installation follow the instruction enclosed with the converter.

ORDERING CODE: **21.0801.039**

**CAN - USB CONVERTER**

It allows Tecnord CAN joysticks to Personal Computer connection with a USB port; for installation follow the instruction enclosed with the interface device.

 ORDERING CODE: **21.0801.040**

**CAN - USB CONVERTER WITH DEUTSCH-DB9 LINKING CABLE**

It allows Tecnord CAN joysticks to Personal Computer connection with a USB port; for installation follow the instruction enclosed with the interface device.

ORDERING CODE: **21.0801.083**

**CAN - USB CONVERTER WITH DEUTSCH-DB9 LINKING CABLE**

With CAN-USB converter and Deutsch-DB9 linking cable. It allows modification of specific parameters on Tecnord CAN joysticks following calibration tool program on CD Rom; for installation follow the instruction enclosed with the interface device.

 ORDERING CODE: **21.0801.062**



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TECHNICAL INFORMATIONS - OPERATORS FOR GRIP ASSEMBLING

DFF - ROCKER SWITCH TYPE

Switch Operation: On-Off-On

ORDERING CODE: **50.1301.500**

Characteristics

Inrush current (capacitive):	16A 250 VAC (contact pair Ag / Cu and basic type 1838)
Contact resistance (new condition):	< 100 mOhm (1 A 12 VDC)
Insulation resistance (new condition):	> 100 mOhm (500 VDC)
Protection type:	IP67 1E6 mechanical life endurance
Ambient temperature:	terminal side -20°C/+105°C actuating side -20°C/+55°C



K1 - ROCKER SWITCH TYPE

Switch Operation	ORDERING CODE
On-Off-On	50.1301.501
On-Off	50.1301.502
Mom-Off-Mom	50.1301.503
Fwd-Neu-Rev	50.1301.504

Characteristics

Load	28 VDC or 125/250 VAC, 60Hz	Cycles
Resistive	10A	50.000
Inductive	10A	25.000

Mechanical life: 100.000 cycles

Seal: IP68S

Operating temperature range: -30°C to +85°C

Materials: Thermoplastic



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TECHNICAL INFORMATIONS - OPERATORS FOR GRIP ASSEMBLING

P9 - PUSH BUTTONS

Switch Operation: On-Off

Case Flush Color	ORDERING CODE
RED	13.0310.549
BLUE	13.0310.551
YELLOW	13.0310.535
BLACK	13.0310.555
GREEN	13.0310.553
WHITE	13.0310.547
PURPLE	13.0310.559
GREY	13.0310.561
ORANGE	13.0310.557

Characteristics

Operational life:	up to 1.000.000 cycles
Rated amperage:	up to 5 A resistive up to 3 A inductive
Protection class:	IP 64 (IP 68S available)
Operating temperature range:	-40°C to +85°C
Button and bezel material:	thermoplastic
Contacts:	gold plated silver alloy



Case Raised Color	ORDERING CODE
RED	13.0310.550
BLUE	13.0310.552
YELLOW	13.0310.528
BLACK	13.0310.556
GREEN	13.0310.554
WHITE	13.0310.548
PURPLE	13.0310.560
GREY	13.0310.562
ORANGE	13.0310.558

Characteristics

Operational life:	up to 1.000.000 cycles
Rated amperage:	up to 5 A resistive up to 3 A inductive
Protection class:	IP 64 (IP 68S available)
Operating temperature range:	-40°C to +85°C
Button and bezel material:	thermoplastic
Contacts:	gold plated silver alloy



P9L - PUSH BUTTONS WITH LED (12 VDC)

Switch Operation: On-Off

Case Flush Color	Led	ORDERING CODE
RED	RED	50.1301.329
BLUE	BLUE	50.1301.332
YELLOW	WHITE	50.1301.331
BLACK	RED	50.1301.345
GREEN	GREEN	50.1301.328
WHITE	RED	50.1301.348
ORANGE	AMBER	50.1301.330

Characteristics

Operational life:	up to 1.000.000 cycles
Rated amperage:	up to 5 A resistive at 28VDC
Protection class:	IP67 (70.000 cycles)
Operating temperature range:	-40°C to +85°C
Button and bezel material:	thermoplastic
Contacts:	gold plated silver



Case Raised Color	Led	ORDERING CODE
RED	RED	50.1301.325
GREEN	GREEN	50.1301.324

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TECHNICAL INFORMATIONS - OPERATORS FOR GRIP ASSEMBLING

APL - LATCHING PUSH BUTTONS

Switch Operation: On-Off Latching

Case Color	Led	ORDERING CODE
RED	X	50.1301.407
RED	RED	50.1301.414
YELLOW	RED	50.1301.415
YELLOW	X	50.1301.416
GREEN	X	50.1301.417

Characteristics

Operational life:	up to 1.000.000 cycles
Rated amperage:	up to 5 A resistive up to 3 A inductive
Protection class:	IP 67
Operating temperature range:	-40°C to +85°C
Button and bezel material:	polyamide 6/6
Contacts:	gold plated silver



SEALING BOOTS

For raised dome

ORDERING CODE: **50.1301.326**

SEALING BOOTS

For flush dome

ORDERING CODE: **50.1301.327**

KNOB POTENTIOMETER TYPE P16

Ohmic value: $4.7\text{k}\Omega \pm 20^\circ$ Electrical travel: $270^\circ \pm 10^\circ$ ORDERING CODE: **50.1501.025**

KNOB POTENTIOMETER TYPE P16

Ohmic value: $10\text{k}\Omega \pm 20^\circ$ Electrical travel: $270^\circ \pm 10^\circ$ ORDERING CODE: **50.1501.031**

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