CATALOGUE

Electronic components & PHC systems

walvoil

FLUID POWER E|MOTION

Additional information
This catalogue shows the product in the most standard configurations.
Please contact our Sales Dpt. for more detailed information or special requests.

WARNING!
All specifications of this catalogue refer to the standard product at this date.
Walvoil, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN INCORRECT USE OF THE PRODUCT.

1st edition April 2014

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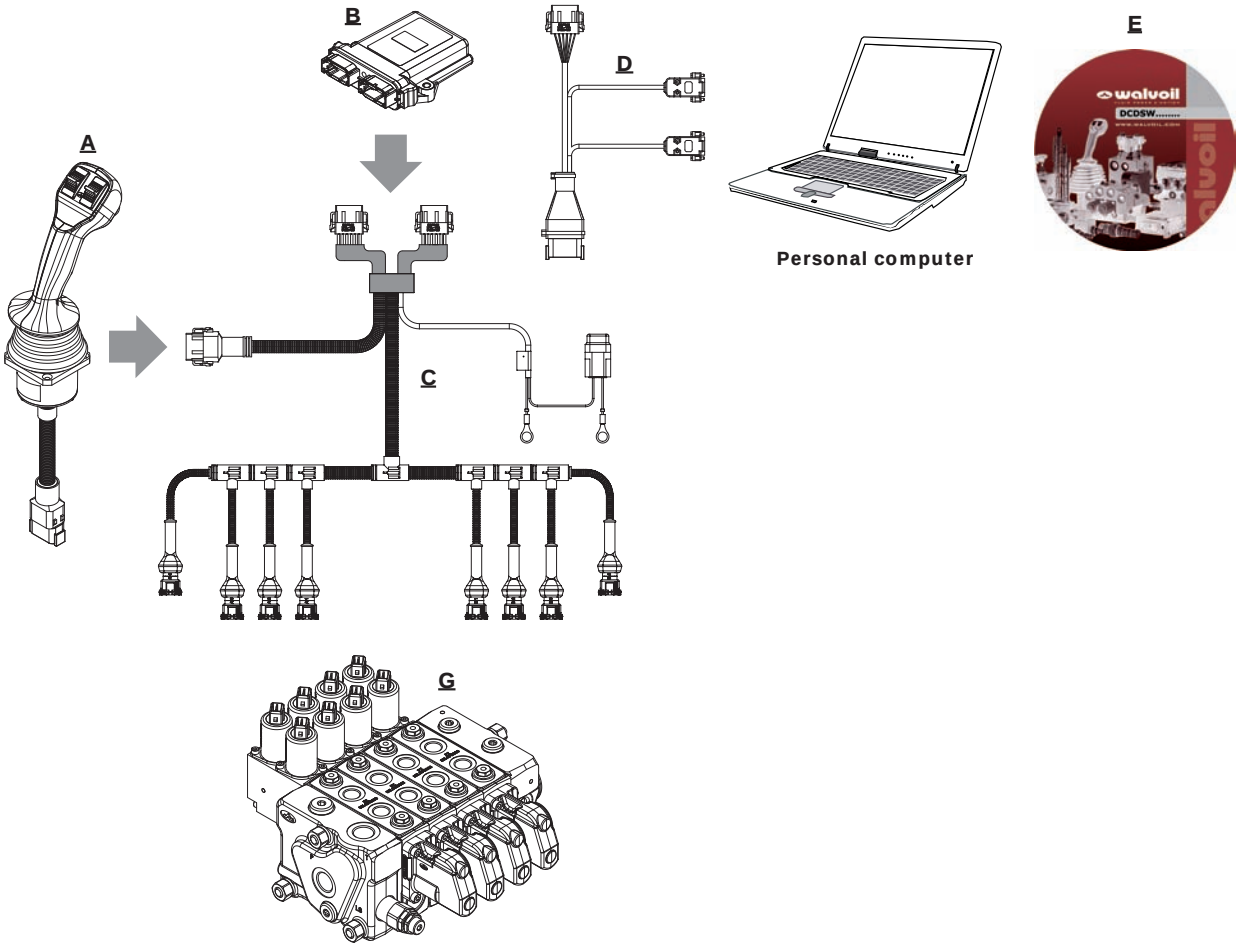
Electronic components

Introduction

Walvoil offers a wide range of electronic devices developed for control systems dedicated to earth moving, agricultural and industrial machines.
Our production includes: proportional joysticks, analog and CAN bus versions, control units and spool position sensors to control the proportional directional valves, with electro-hydraulic or mechatronic controls.
These components allow to implement the machine logic functionality and the system operational safety requested by the application.
Complete control systems are available as well. They were born thanks to the experience shared with important OEMs in their sector.



A - Proportional Joysticks
The AJW-CJW are proportional contactless joysticks for Walvoil handles.
The contactless technology guarantees long life and precise comfortable control.
The robust mechanical design is specifically tailored to off-highway operating machines.
Different output options are available for easy interfacing to the machine ECU (e.g. analog, CAN,....). The CAN version is standard CANopen. Redundant options for safety applications are available.
The MDN joysticks are compact, low profile control devices that provide precise fingertip control in one or double axis.
Compact dimensions make them suitable for installation with reduced operation space like armrests and remote control chest packs.
In applications where operation safety, long life and maintenance absence are decisive features, they provide reliability and operating simplicity.

Introduction

B - CED Electronic Control Units

These control units are dedicated to PHC standard systems.
The relation between the unit inputs and outputs and the system logic functionality is predefined, not modifiable by the user.
Only the application working parameters can be modified to optimize the electro-hydraulic system installation on the machine.
This customization is made through a WST software tool.
The control units are protected against the battery overvoltage and reverse polarity, and input/output short-circuits to battery/ground. Outputs current compensated and stabilized.

Description specification: **CED 4 0 0 X**

- Nr. of prop. functions
- Nr. of on/off functions
- High speed control (if present)
- Progressive number

C - Harnesses

These are the connection harnesses for the predefined PHC standard systems.
The KCDs (Kit Connection Devices) provide the connections between the devices included into these systems, the electronic joystick, the electronic control unit and the main hydraulic valve.
They are made with single wires, mechanically protected by corrugated tube.
The power line connection to the system battery is fuse protected.
The connections to the devices are realized with DEUTSCH DTM and/or AMP JPT connectors.
The harnesses are suitable for a static or fixed installation, for agricultural, industrial and civil applications.

Description specification: **KCD 04**

- Nr. connection lines

D - Accessories

A wide range of accessories is available to enable the interface among the electronic devices on this catalogue.
They are useful to let the user build the harness connection requested for and to allow the electronic components to work together.
The connectors are already preassembled with standard multipolar cables: just a simple electrical connection between wires is requested to implement the correct electrical schema.
The programming cables and software are available to dialog with the control units, for the optimal application parameters settings, and diagnostic purposes.

E - WST control unit programming software

The CED electronic control units are programmed in the Company with default operating parameters, suitable for most applications.
For special applications, the WST (Walvoil Service Tool) software can be used together with a personal computer to optimize the control parameters for the electrohydraulic modules. For example, minimum and maximum output current values can be set for linear curves.

F - PHC electronic systems

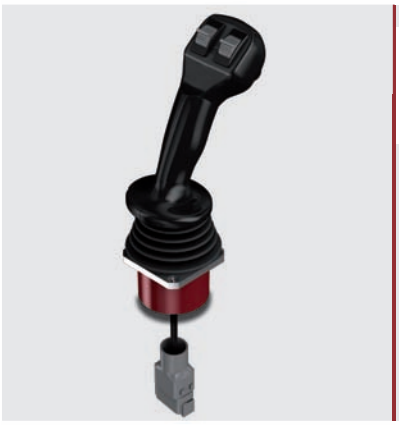
The PHCs (Power Hydraulic Control) are complete electronic systems, made of one or more joysticks, one or more control units, and their connection harness.
They can be used to control almost all Walvoil directional valves; they are designed to exploit the full potential, in terms of performances and safety, of the different system components.
For both the command devices (e.g. joysticks) and the control devices (e.g. control units), the redundancies on the input and output lines are managed by improving the robustness level of the application.
Thanks to a dedicated diagnostic tool, the WST software, the operator can set-up to the optimal configuration for the system, or make diagnostic on it.

Description specification: **PHC 4 0 0 F**

- Nr. of prop. functions
- Nr. of digital outputs
- Progressive number
- Control signal type
  - **P** = potentiometric/ratiometric, 25%-75% VB
  - **F** = fixed, 0.5-4.5 V
  - **C** = CAN bus

G - Directional control valve

Walvoil offers a wide range of directional control valves, monoblock, sectional, open center, Load Sensing, Flow Sharing, which can be configured with proportional electro-hydraulic and mechatronic controls.
Please contact our Sales Department to request for the documentation.



AJW analog joystick

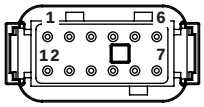
- Hall effect contactless double axis joysticks
- The contactless technology guarantees long life and precise comfortable control
- Robust mechanical design; specifically tailored to off-highway operating machines
- Handles with additional proportional axis

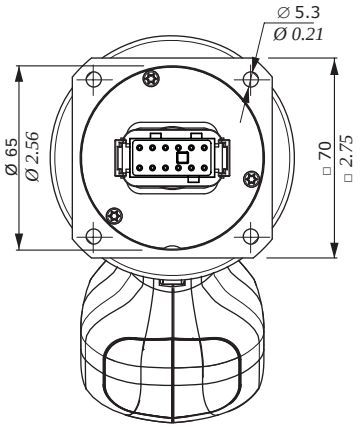
Working conditions		
Electrical specifications		**AJW**
Supply voltage		from 8 to 32 V regulated 5±0.1V
Current consumption	without grip	max. 20 mA at 32 V
Output signal	full range	from 0.5 to 4.5 V - 2.5 V in neutral
	tolerance (in neutral and full stroke)	±0.15 V both sides per axis
	redundancy signal (crossed)	from 4.5 to 0.5 V - 2.5 V in neutral
	max. load	< 1 mA
Mechanical specifications		
Lever angle	operation	± 20° both axis
	tolerance	±1
Lever force (X,Y axis)	stroke end	6±1N (fully actuated 190 mm - *7.48 in* above flange)
Operating life	on each axis (full stroke cycles)	>10^6
Weight	without grip	0.50 Kg (*1.10 lb*)
Environmental specifications		
Working temperature		from -40° C to +85° C *(from -40° F to 185° F)*
Storage temperature		from -40° C to +85° C *(from -40° F to 185° F)*
Weather protection	above fixing plan	IP65
EMC compatibility		100 V/m - ISO13766, ISO14982
“Dead man” switch features		
Contact type		NA
Current rating (24 VDC)		200 mA resistive load
Mechanical life (nr. of operations)		10^6
Electric life (nr. of operations)		3x10^4
Operating force		3.4 N
Weather protection		IP67
Test specifications		
Mechanical vibration	random	from 5 to 500 Hz, 5,4x10^4 to 0,56 g^2/Hz, 100 h each axis
	sinusoidal	40 m/s^2 from 10 to 2000 Hz
	bumps	100 applications - 400 m/s^2 x 6 ms
Humidity	96%	240 h
Thermal shock		100 cycles, from -40° C to 85° C and back, 50° C/min *(100 cycles, from -40° F to 212° F and back, 122° F/min)*
Salt spray	exposure	100 h

AJW analog joystick

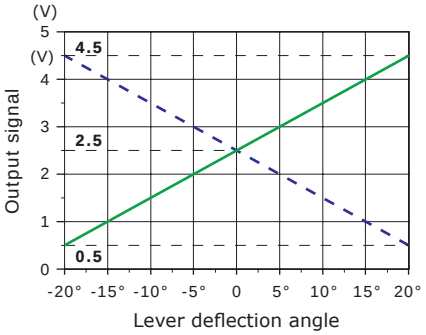
Dimensions and features

DTM04-12P
Deutsch connector

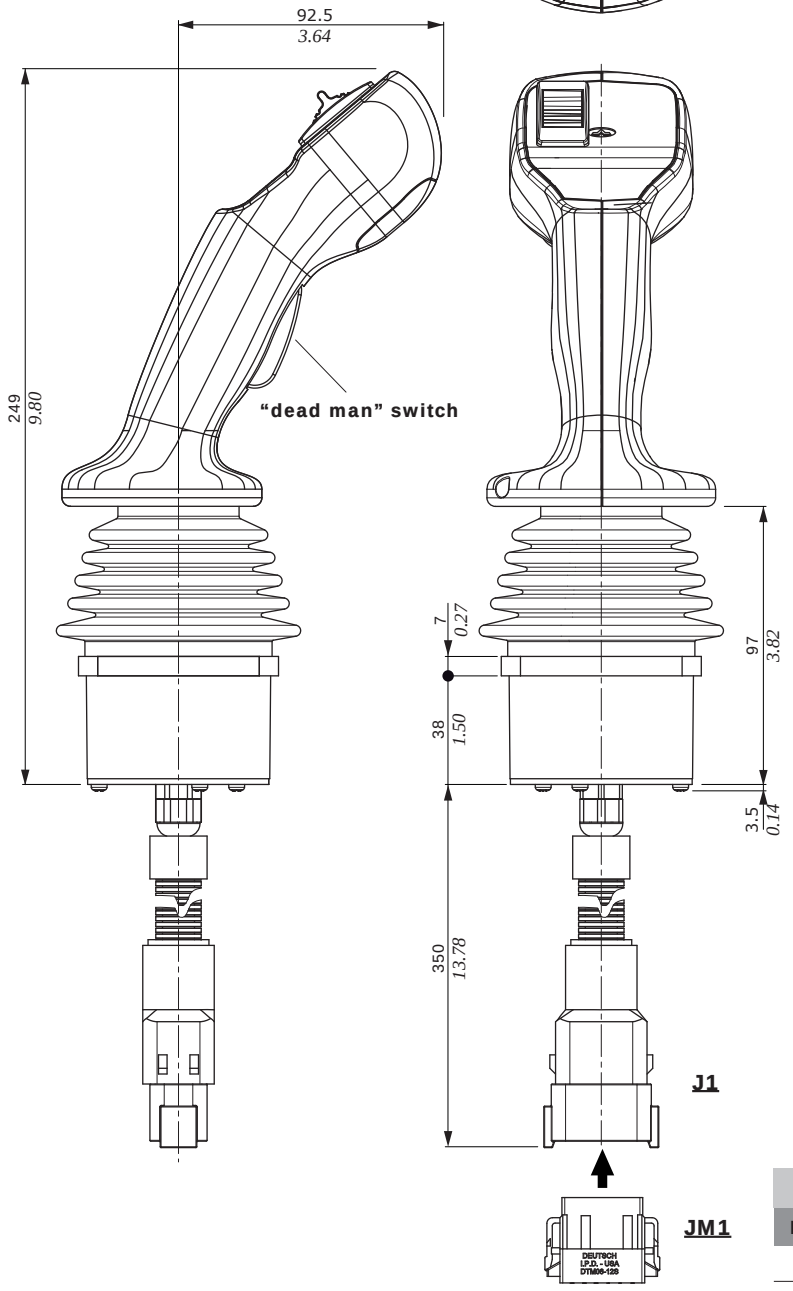


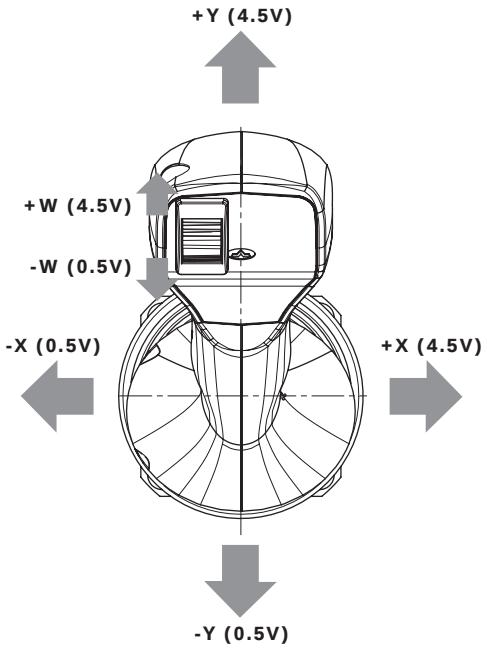


Joystick output signal



Output A signal
Output B redundant optional signal





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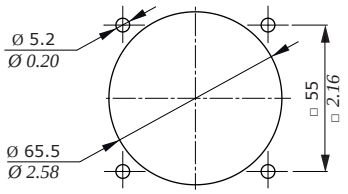
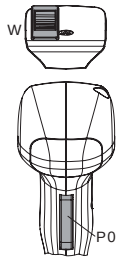
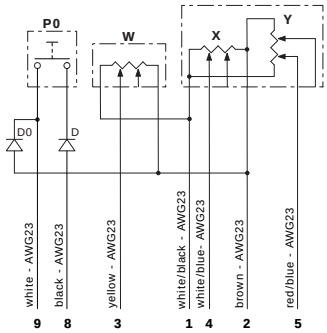


Mating connector	
Name	**Type**
JM1	DTM06-12S Deutsch

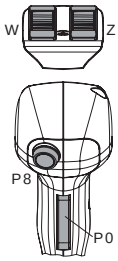
Configurations



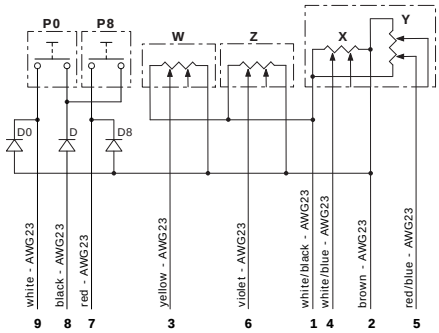
Code	**183540027**
Description	AJW2000A-PZA0100DQ-0RD-WN140/(D2F12035)-(TC-PROT)
Plate	1 ARW* type proportional roller (W)
Front zone	"dead man" switch (P0)



Pin	Function
1	VJ+
2	VJ-
3	W axis
4	X axis
5	Y axis
6	plugged
7	plugged
8	VJ+
9	P0 dead man
10	plugged
11	plugged
12	plugged

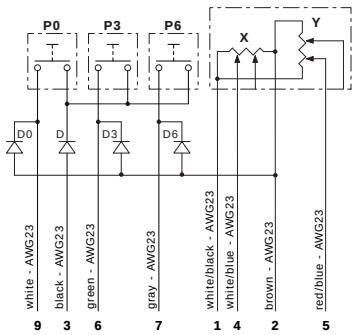


Code	**183540028**
Description	AJW2000A-PZTM0200BQ-0RD-8R2D-WN140-ZN140/(D2F12035)-(TC-PROT)
Plate	2 ARW* type proportional rollers (W-Z)
Front zone	1 T* type push-button with spring return (P8), "dead man" switch (P0)



Pin	Function
1	VJ+
2	VJ-
3	W axis
4	X axis
5	Y axis
6	Z axis
7	P8 push-button
8	VJ+
9	P0 dead man
10	plugged
11	plugged
12	plugged

Code	**183540029**
Description	AJW2000A-PTA2000CQ-0RD-3R2D-6R2D/(D2F12035)-(TC-PROT)
Plate	2 T* type push-buttons with spring return (P3-P6)
Front zone	"dead man" switch (P0)



Pin	Function
1	VJ+
2	VJ-
3	VJ+
4	X axis
5	Y axis
6	P3 push-button
7	P6 push-button
8	plugged
9	P0 dead man
10	plugged
11	plugged
12	plugged

NOTE (*): for component features see next page

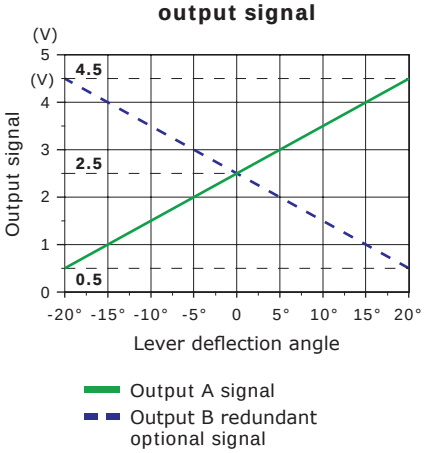
AJW analog joystick

Electric device features

ARW type proportional roller	
Supply voltage	from 8 to 32 VDC
Max. current consumption	< 24 mA
Max. output current	1 mA
Output signal (range)	0,5 - 4,5 V
Output signal (central position)	2,5V
Signal tolerance (central position and stroke end)	±100 mV
Minimum load	10 KΩ
Actuator deflection angle	± 35° (±1°)
Mechanical life (nr. of operations)	10^6
Operating force	2 N
Mechanical vibration	IEC 68-2
Mechanical shock	EN 60068-2-29 (pulse 400m/s² x 6 ms, 100 times)
Weather protection	IP67-IP69K
EMC compatibility	ISO 13766 ISO 14982

T type ON / OFF push-button	
Execution	spring return
Contact type	normally open
Current rating	200 mA resistive load @ 12 VDC
Mechanical life (nr. of operations)	10^6
Electric life (nr. of operations)	$20x10^4$
Weather protection	IP64

Proportional roller output signal



CJW CAN bus joystick

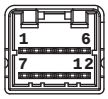
- Contactless single or double axis joysticks
- CAN bus models
- The contactless technology guarantees long life and precise comfortable control
- Robust mechanical design; specifically tailored to off-highway operating machines
- Handles with additional proportional axis

Working conditions		
Electrical specifications		**CJW**
Supply voltage		from 8 to 31 V
Current consumption	without grip	max. 100 mA @ 31 V
Output CAN protocols		SAE J1939, CANopen, CAN 2.0A and 2.0B
Mechanical specifications		
Lever angle	operation	± 20° both axis
	tolerance	±1
Lever force (X,Y axis)	stroke end	6±1N (fully actuated 190 mm - *7.48 in* above flange)
Operating life	on each axis (full stroke cycles)	$>10^6$
Weight	without grip	0.50 Kg (*1.10 lb)*
Environmental specifications		
Working temperature		from -40° C to +85° C (*from -40° F to 185° F)*
Storage temperature		from -40° C to +85° C (*from -40° F to 185° F)*
Weather protection	on the fixing plan	IP65
EMC compatibility		100 V/m - ISO13766, ISO14982
“Dead man” switch features		
Contact type		NA
Current rating (24 VDC)		200 mA resistive load
Mechanical life (nr. of operations)		10^6
Electric life (nr. of operations)		$3x10^4$
Operating force		3.4 N
Weather protection		IP67
Test specifications		
Mechanical vibration	random	from 5 to 500 Hz, $5,4x10^4$ to 0,56 g^2/Hz, 100 h each axis
	sinusoidal	40 m/s^2 from 10 to 2000 Hz
	bumps	100 applications - 400 m/s^2 x 6 ms
Humidity	96%	240 h
Thermal shock		100 cycles, from -40° C to 85° C and back, 50° C/min *(100 cycles, from -40° F to 212° F and back, 122° F/min)*
Salt spray	exposure	100 h

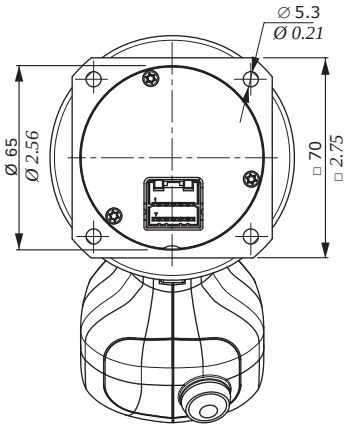
CJW CAN bus joystick

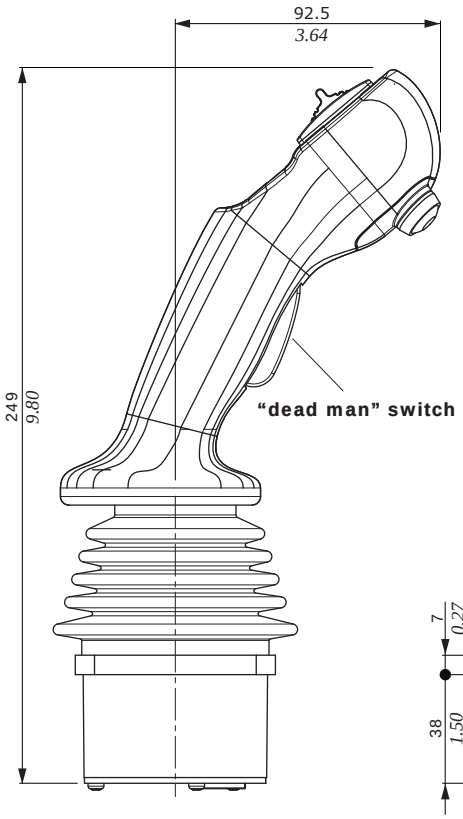
Dimensions and features

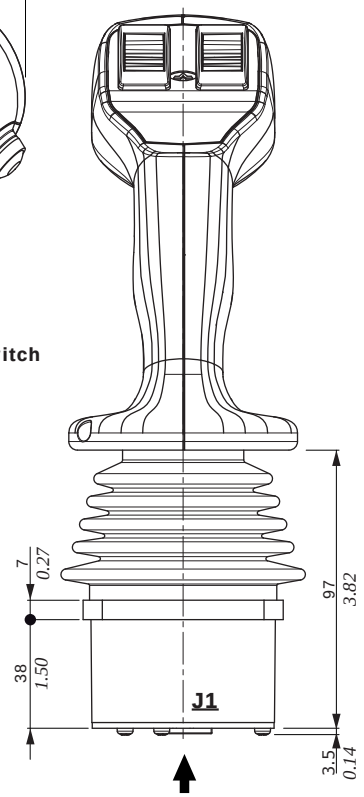
Multi-lock 040 series
Tyco connector
(tin plated contacts)



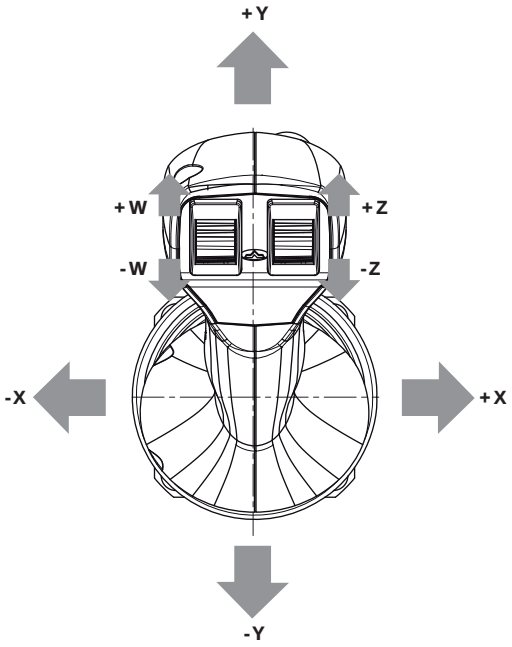
J1 connector PIN-OUT			
Pin	Function	Pin	Function
1	not conn.	7	not conn.
2	not conn.	8	not conn.
3	CAN_L	9	not conn.
4	CAN_H	10	not conn.
5	VJ-	11	VJ+
6	not conn.	12	not conn.







Mating connector	
Name	Type
JM1	Multilock series 040 Tyco



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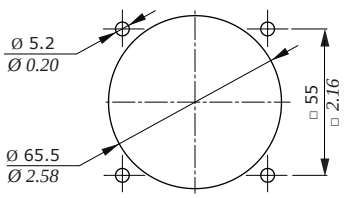
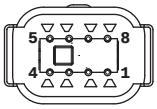
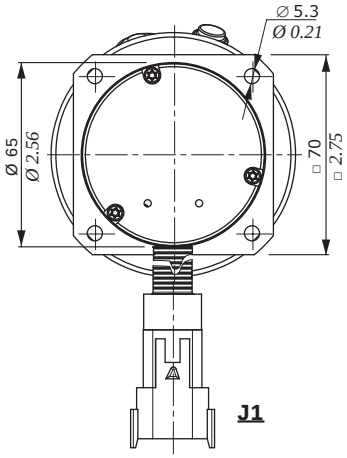


Dimensions and features

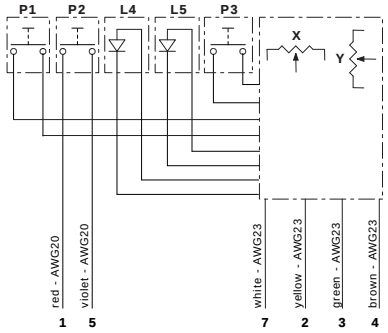
DTM04-8P
Deutsch connector



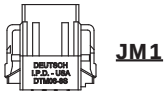
J1 connector PIN-OUT			
Pin	**Function**	**Pin**	**Function**
1	VK+	**5**	Push-button P2
2	CAN_L	**6**	plugged
3	CAN_H	**7**	VJ+
4	VJ-	**8**	plugged

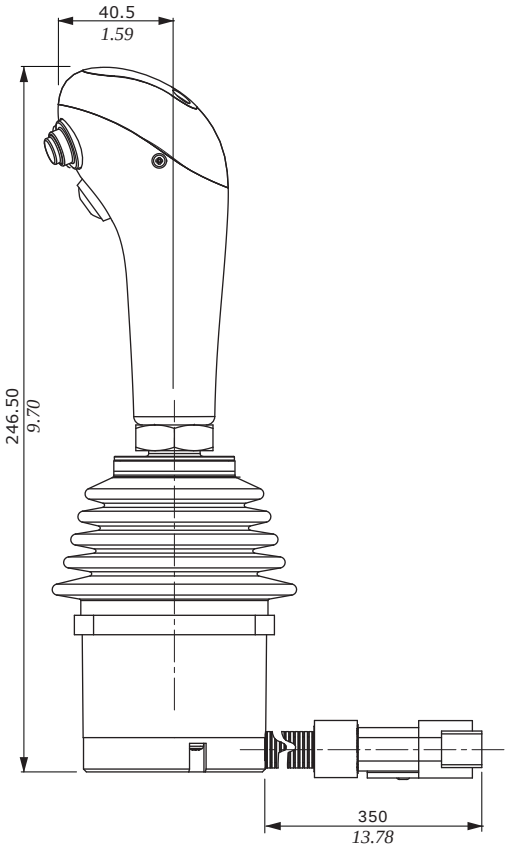


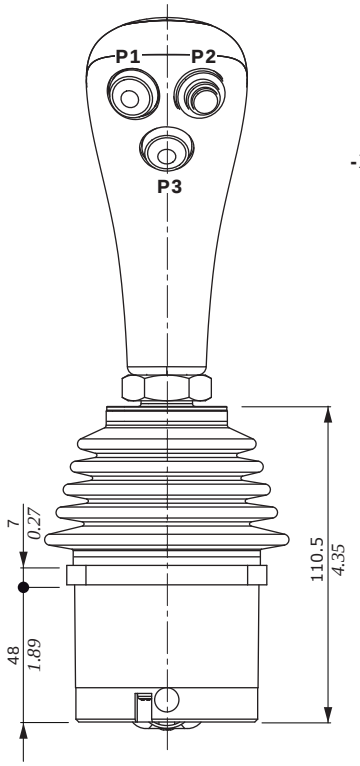
Electrical wiring

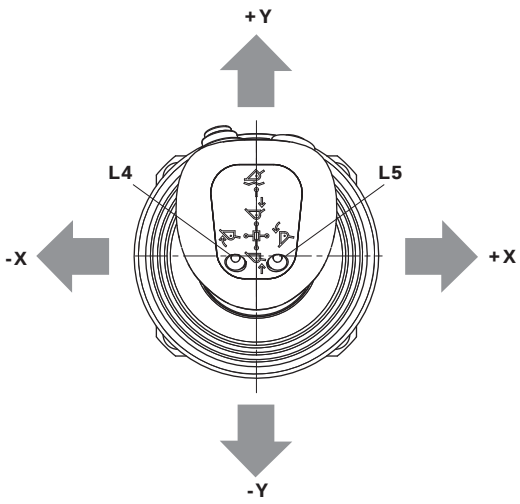


Mating connector	
Name	**Type**
JM1	DTM06-8S Deutsch









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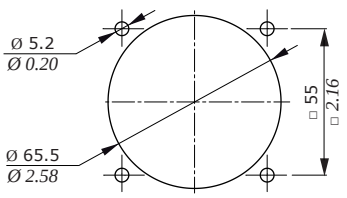
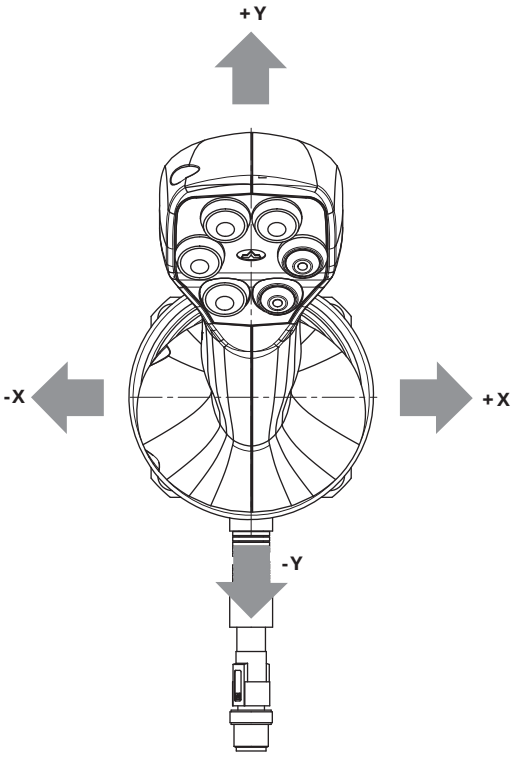
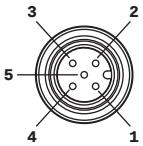


CJW CAN bus joystick

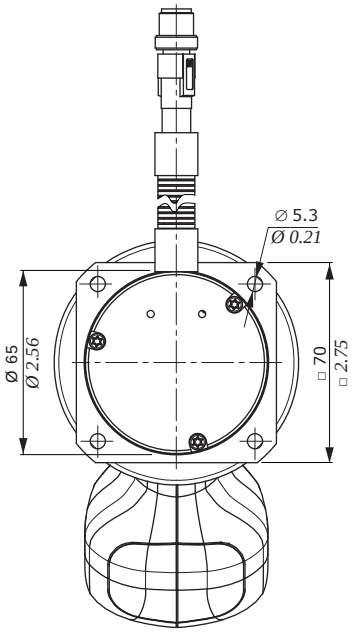
Dimensions and features



5 poles - M12 male connector
(gold plated contacts)



J1 connector PIN-OUT	
Pin	**Function**
1	CAN_H
2	CAN_L
3	VJ+
4	VJ-
5	VK+



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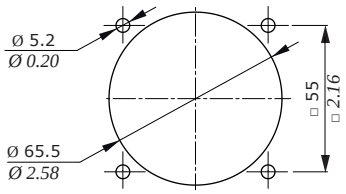
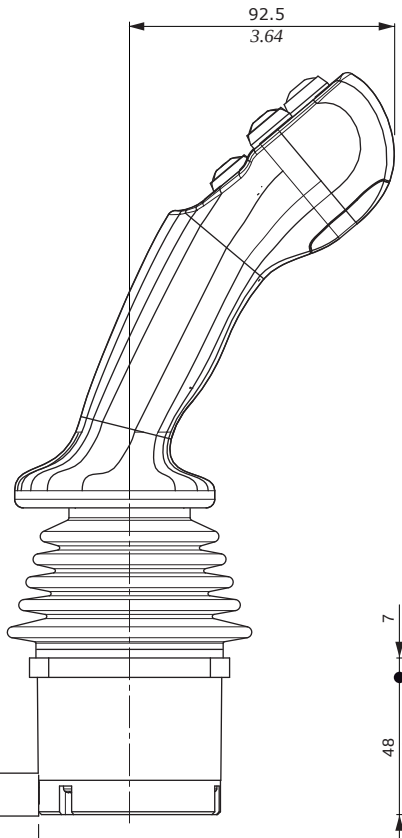
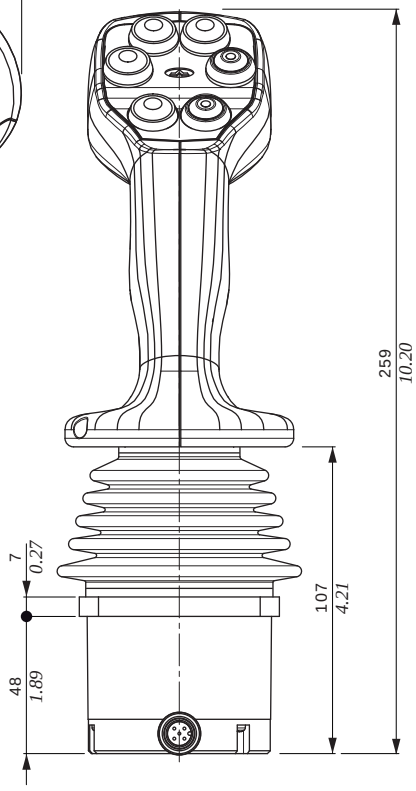
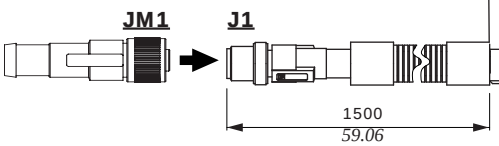


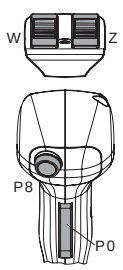




Mating connector	
Name	**Type**
JM1	5 poles - M12 female

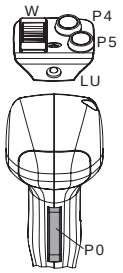


Configurations

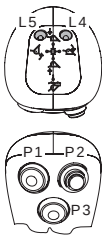


Code	**183530011**
Description	CJW2010A-PZTM0200BQ-0R-8R2-WN140-ZN140/A8F12
Plate	2 ARW* type proportional rollers (W-Z)
Front zone	"dead man" switch (P0), 1 push-button with spring return (P8)

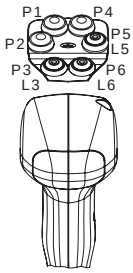
Code	**183530012**
Description	CJW2010A-PZTA2101BQ-0R-1R2-2R2-URL-ZN140/A8F12-<JOYSTICK SX>
Plate	1 ARW* type proportional roller (Z), 2 T* type push-buttons with spring return (P1-P2), 1 LED (LU); left configuration
Front zone	"dead man" switch (P0)



Code	**183530013**
Description	CJW2010A-PZTA2101CQ-0R-4R2-5R2-URL-WN140/A8F12-<JOYSTICK DX>
Plate	1 ARW* type proportional roller (W), 2 T* type push-buttons with spring return (P1-P2), 1 LED (LU); right configuration
Front zone	"dead man" switch (P0)



Code	**183530010**
Description	CJW2043A-FWV-B-1KN5-2KN5-3MR2/(D2F08035-(TC)
Plate	2 LED (L4-L5)
Front zone	1 K* type push-button (P2), 1 M* type push-button with spring return (P1), 1 M* type push-button with detent (P3)



Code	**183530017**
Description	CJW2040A-PMB6000AQ-1N2-2N2-3R4-4N2-5Y8-6V9/(F1M05150)-(TC)
Plate	3 M* type push-buttons with spring return (P1-P2-P4), 2 M* type push-buttons with spring return and LED (P5/L5-P6/L6),1 M* type push-button with dtent and LED (P3/L3)
Front zone	-

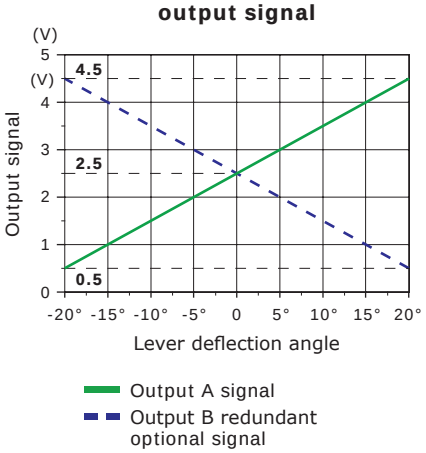
NOTE (*): for component features see next page

CJW CAN bus joystick

Electric device features

ARW type proportional roller	
Supply voltage	from 8 to 32 VDC
Max. current consumption	< 24 mA
Max. output current	1 mA
Output signal (range)	0,5 - 4,5 V
Output signal (central position)	2,5V
Signal tolerance (central position and stroke end)	±100 mV
Minimum load	10 KΩ
Actuator deflection angle	± 35° (±1°)
Mechanical life (nr. of operations)	10^6
Operating force	2 N
Mechanical vibration	IEC 68-2
Mechanical shock	EN 60068-2-29 (pulse 400m/s² x 6 ms, 100 times)
Weather protection	IP67-IP69K
EMC compatibility	ISO 13766 ISO 14982

Proportional roller output signal



T type ON / OFF push-button	
Execution	spring return
Contact type	normally open
Current rating	200 mA resistive load @ 12 VDC
Mechanical life (nr. of operations)	10^6
Electric life (nr. of operations)	$20x10^4$
Weather protection	IP64

M type ON / OFF push-button	
Execution	spring return, with detent
Contact type	normally open
Current rating	200 mA @ 12 VDC resistive load
Mechanical life (nr. of operations)	10^6
Electric life (nr. of operations)	$5x10^5$
Mechanical life (nr. of operations)	IP67
Electric life (nr. of operations)	10 mA

K type ON / OFF push-button	
Execution	spring return
Contact type	normally open
Current rating	5 A resistive load @ 12 VDC
Mechanical life (nr. of operations)	10^5
Electric life (nr. of operations)	$25x10^3$
Weather protection	IP64

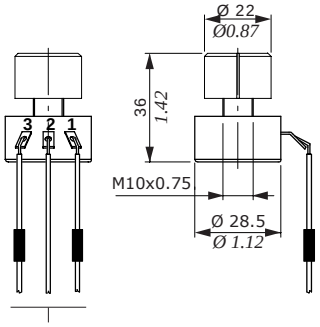
Potentiometric joysticks

- Potentiometric/ratiometric signal
- Analog proportional signal
- On/off redundant, or neutral, signal
- Robust construction

Working conditions		
General features	**PTM104**	**MDN142**
Type	rotative potentiometer	single axis joystick
Max. supply voltage (Vin)	35VDC	35VDC
Power absorption	0.4 W @ 40°C *(104°F)*	0.25W @ 25°C *(77°F)*
Connector	flying leads	Dupont Dubox
Lever deflection - Working angle	300° ± 5°	±30°
Average lifetime (nr. of operations)	10^4	>5x10^6
Working temperature	from -40° C to +70° C *(from -40° F to 158° F)*	from -25° C to +70° C *(from -13° F to 158° F)*
Weather protection (on the fixing plan)	nd	IP66
Analog track		
Total resistance	5KΩ ±20%	5KΩ ±20%
Output signal range (Vout/Vin%)	from 50% to 75%	from 25% to 75%
Central position signal (Vout/Vin%)	50% ACKW	50%
Directional and center switch off		
Switch center gap	/	2.5° either directions
Max. load current	nd	2mA

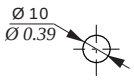
PTM104 rotative potentiometer

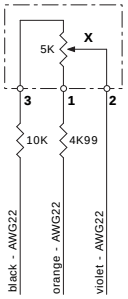
Dimensions and features



n.3 x AWG22, length 400 mm - *15.7 in*

Panel cut out



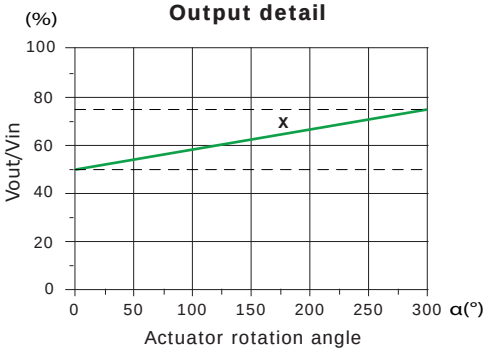


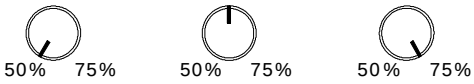
Pin	Wire	Description
1	orange	Supply + (VJ+)
2	violet	Proportional signal (X)
3	black	Supply - (VJ-)

Ordering codes

Description	Code
PTM104 potentiometer	**5POT100005**

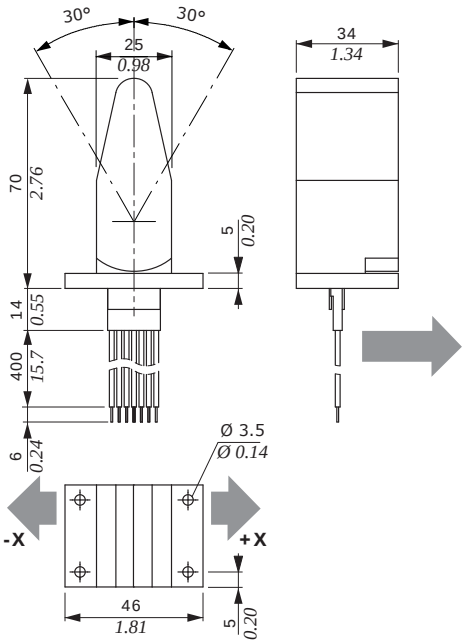
Output detail





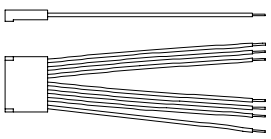
MDN142 potentiometric joystick

Dimensions and features

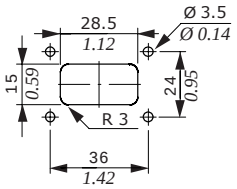


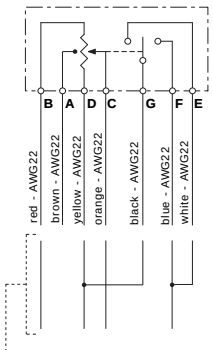
Connecting cable

7 poles cable included in the joystick, with Dubox Housing 65240-007 type female connector and AWG22 wires with tin-plate terminals.



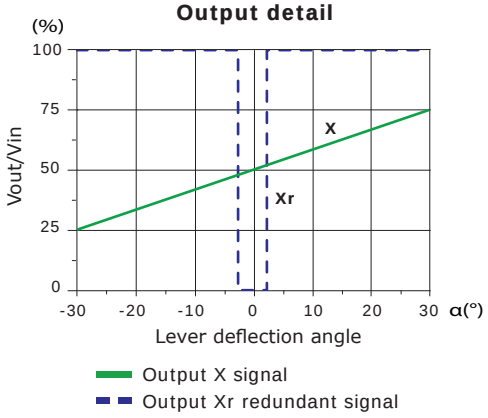
Panel cut out





Interface: to use the joystick redundancy option, this wiring is required

Output detail



Ordering codes

Description	Code
MDN142 complete joystick	**VJOY200001**
7 poles cable, as spare part	**W0450003**

Pin	Wire	Description
A	brown	Center proportional signal
B	red	Supply - (VJ-)
C	yellow	Supply + (VJ+)
D	orange	Proportional signal (X)
E	white	Signal redundancy - (Xr)
F	blue	Signal redundancy + (Xr)
G	black	Common redundancy

CED100X - CED400X electronic control units

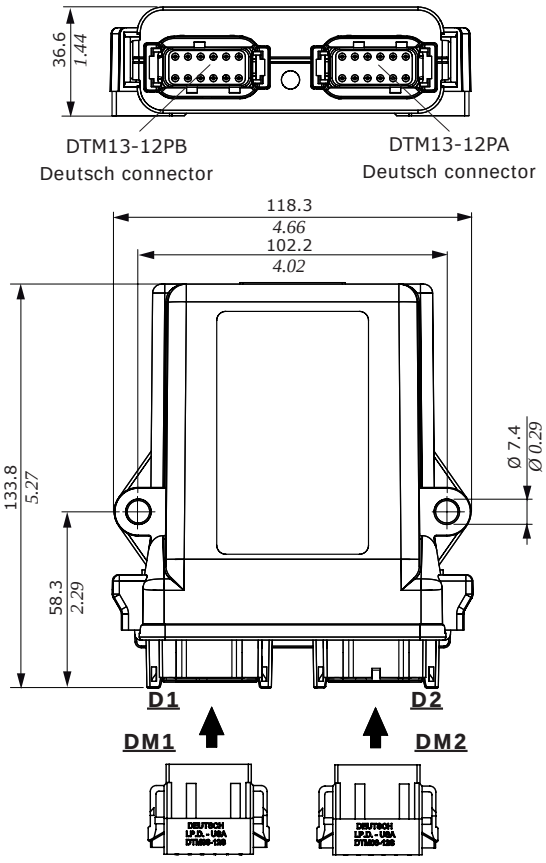
- 12/24 VDC applications
- "Dead man" switch management
- Float function management
- Fast/Slow function management
- From one (1 input / 2 outputs) on CED100X to four (4 input / 8 outputs) proportional functions on CED400X
- Designed for PHC electronic systems

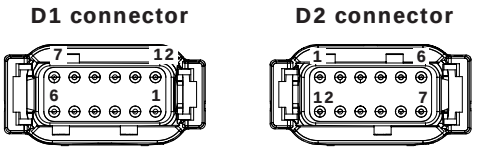
Working conditions		
General features	**CED100X**	**CED400X**
Supply voltage	from 8 to 32 V	from 8 to 32 V
Current consumption	<100 mA	<100 mA
Max. current output	6 A - 12 VDC	6 A - 12 VDC
Interface	RS232, 9600, 8, n, 1	RS232, 9600, 8, n, 1
EMC compatibility	ISO13766, ISO14982	ISO13766, ISO14982
Environmental compatibility	IEC60068-2-6/27/29	IEC60068-2-6/27/29
Working temperature	from -40 to +85°C (*from -40°F to 185°F)*	from -40 to +85°C (*from -40°F to 185°F)*
Protection degree	IP67 with mating connector attached	IP67 with mating connector attached
Weight	0.3 Kg *(0.66 lb)*	0.3 Kg *(0.66 lb)*
Analog inputs		
Number	up to 4	up to 4
Signal type	0/VB or from 0 to 5 V	0/VB or from 0 to 5 V
Digital inputs		
Number	up to 6	up to 6
Signal type	0/VB, from 0 to 50 KHz	0/VB, from 0 to 50 KHz
Proportional outputs		
Number	1 pair	4 pairs
Type	2HSD + 1LSD*	8HSD* + 4LSD*
Signal	PWM on LSD*	PWM on LSD*
Frequency	from 50 to 300 Hz, amplitude from 100 to 300 mA	from 50 to 300 Hz, amplitude from 100 to 300 mA
Max. load	2 A	2 A

NOTE (*): HSD - High Side Driver
LSD - Low Side Driver

CED100X - CED400X electronic control units

Dimensions and pin-out





Connector PIN-OUT						
Pin	D1 connector			D2 connector		
	function	CED100X	CED400X	function	CED100X	CED400X
1	VK+	•	•	OUT_8	-	•
2	AI_4	•	•	OUT_2	•	•
3	AI_3	•	•	OUT_4	-	•
4	DI_1	•	•	OUT_3	-	•
5	RX	•	•	OUT_6	-	•
6	CAN_L	•	•	OUT_5	-	•
7	CAN_H	•	•	GND_3	-	•
8	TX	•	•	GND_2	-	•
9	DI_2	•	•	GND_1	•	•
10	AI_1	•	•	GND_4	-	•
11	AI_2	•	•	OUT_1	•	•
12	VB-	•	•	OUT_7	-	•

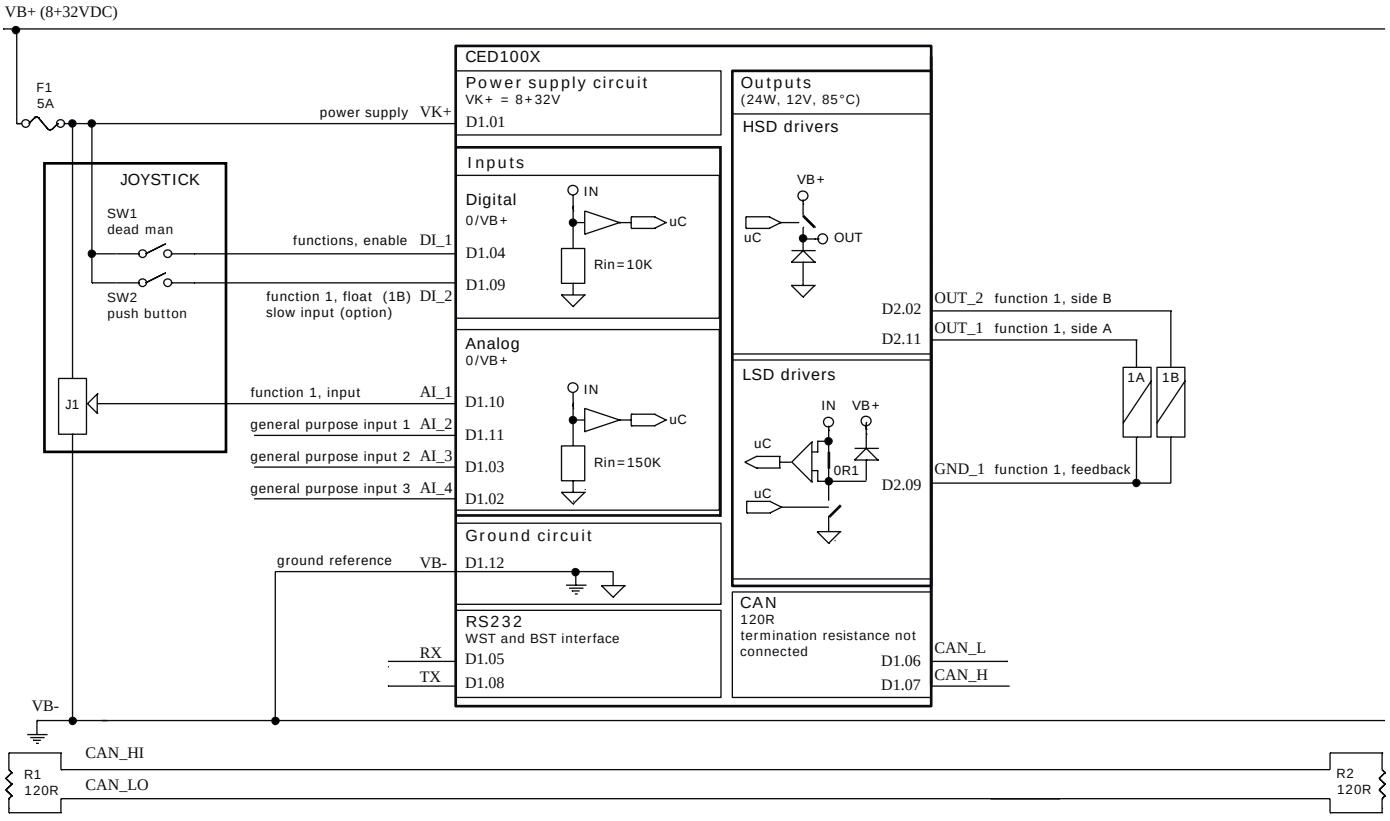
Mating connectors	
Name	Type
DM1	DTM06-12S Deutsch
DM2	DTM06-12SB Deutsch

• available
- not available

CED100X control unit code	
Code	183331001
Description	CED100X/WALVOIL/PHC100F/v43.02
Notes	Supply voltage 8-32V 1 prop. functions (2 outputs - 2A)

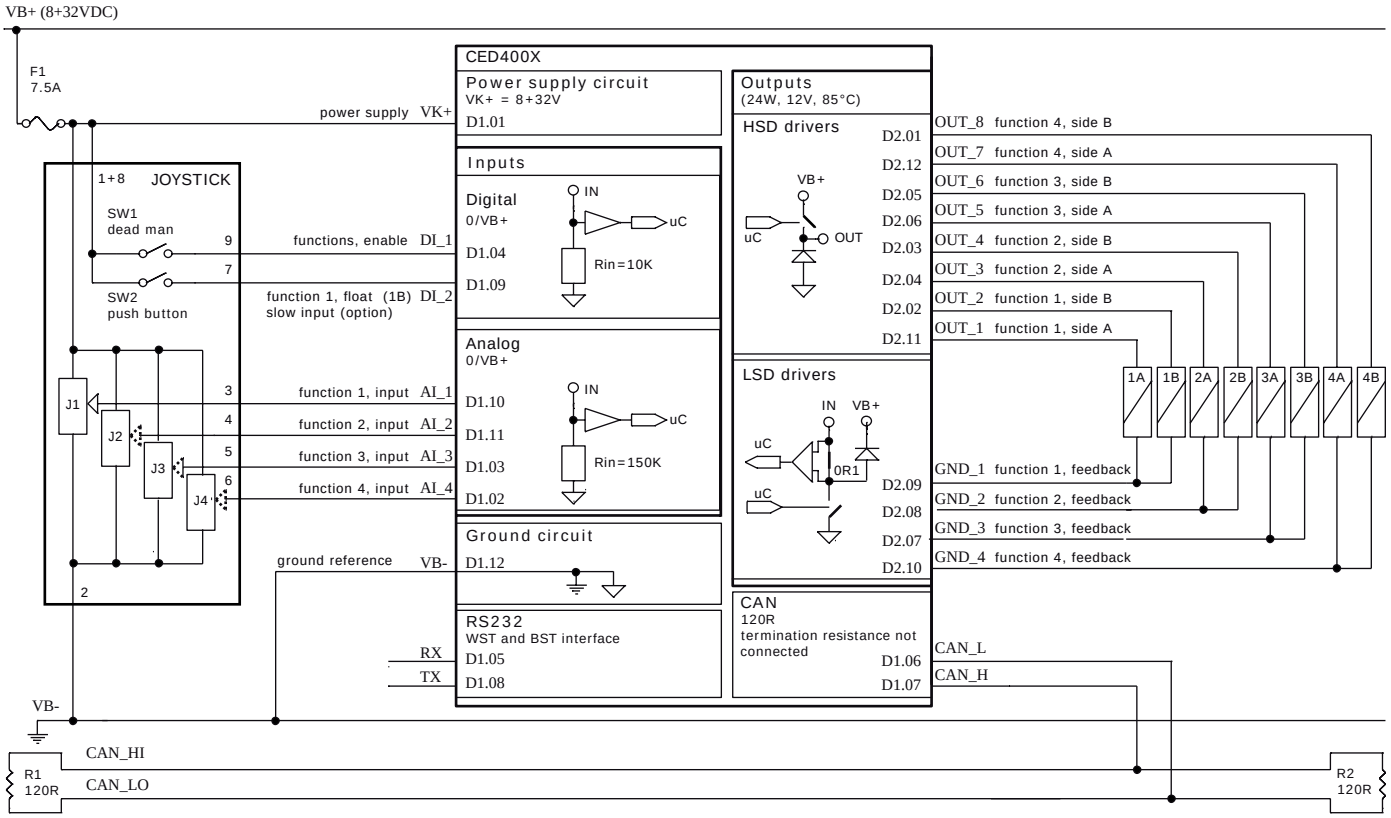
CED400X control unit codes	
Code	183334003
Description	CED400X/WALVOIL/PHC400F/v43.02
Notes	Supply voltage 8-32V 4 prop. functions (8 outputs - 2A)
Code	183338007
Description	CED400X/WALVOIL/PHC400C/v73.01
Notes	Supply voltage 8-32V, CAN bus interface, 4 proportional functions (8 outputs - 2A)

CED100X system diagram



CED100X - CED400X electronic control units

CED400X system diagram



CED040 electronic control unit

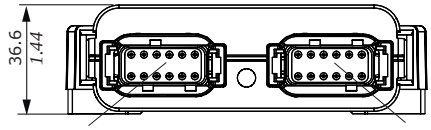
- 12VDC applications
- Designed for PHC electronic systems
- Four digital outputs control (by 4 relays)

Working conditions	
General features	**CED040**
Supply voltage	from 9 to 16 V
Current consumption	50 mA (no-load current) 15A (max. supply)
Max current output	15 A (2 output)
Interface	CAN 2.0 A - B
EMC compatibility	150 V/m - ISO13766, ISO14982
Environmental compatibility	IEC60068-2-6/27/29
Working temperature	from -40 to +85°C (*from -40°F to 185°F)*
Protection degree	IP67 with mating connector attached
Weight	0.3 Kg *(0.66 lb)*
Analog inputs	
Number	3
Signal type	from 0.5 to 4.5 V
Digital inputs	
Number	6
Signal type	0/VB
ON / OFF outputs	
Number	4
Type	relay (HSD*)
Max. load	7.5 A

NOTE (*): HSD - High Side Driver

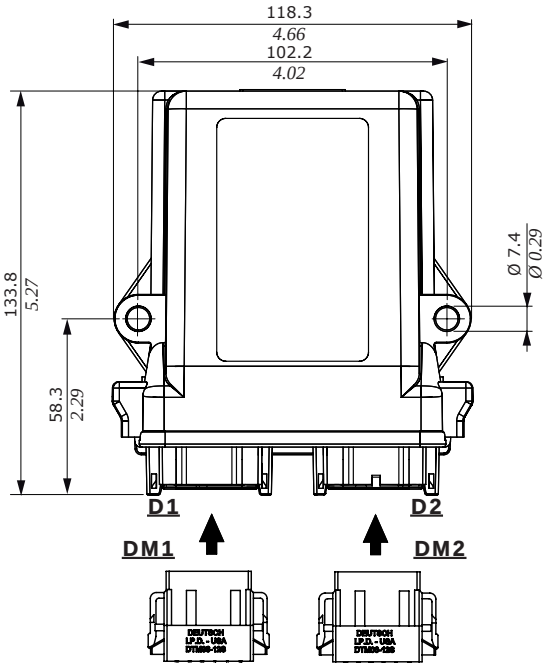
CED040 electronic control unit

Dimensions and pin-out

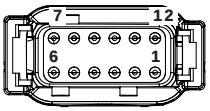


DTM13-12PB
Deutsch connector

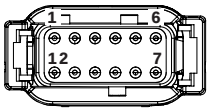
DTM13-12PA
Deutsch connector



D1 connector



D2 connector



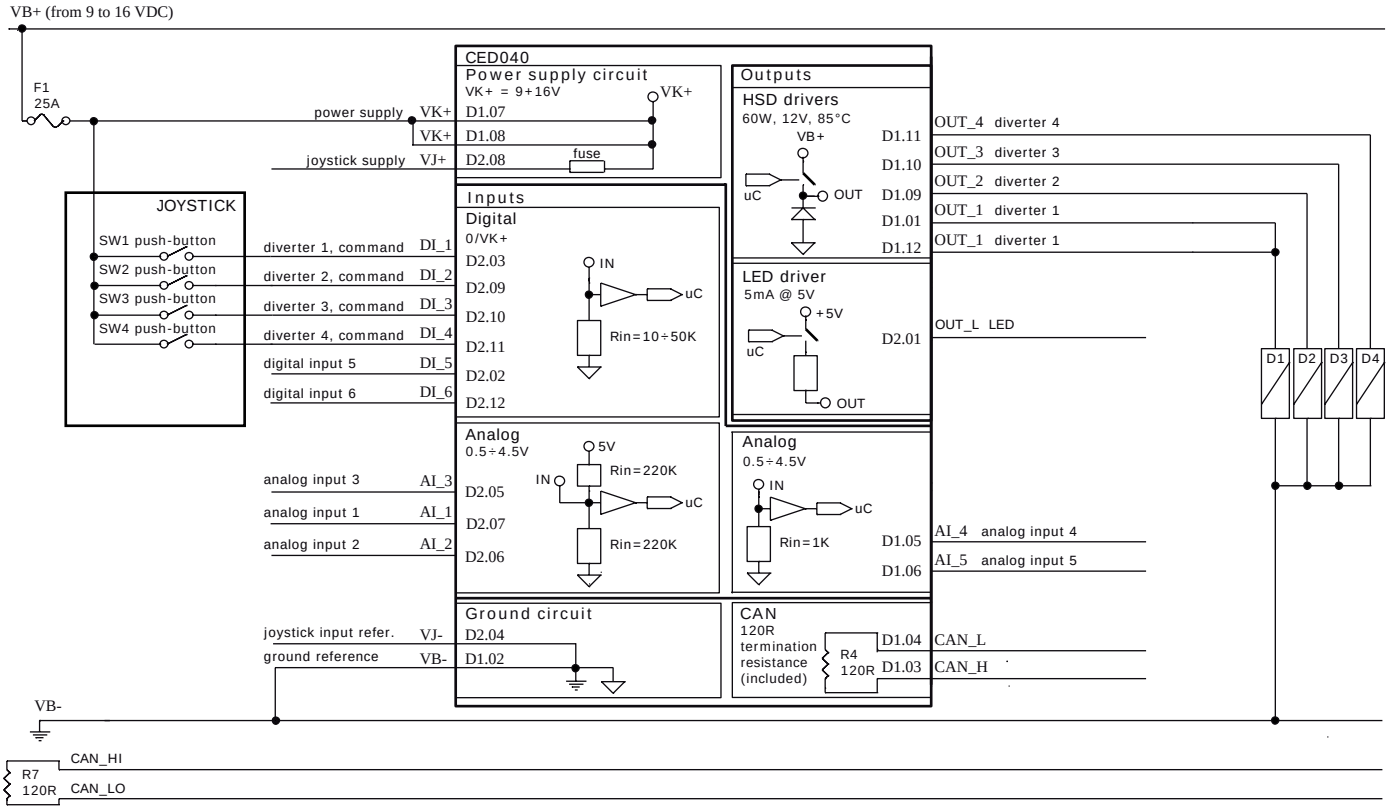
Connectors PIN-OUT		
Pin	Function	
	D1 connector	D2 connector
1	OUT_1	OUT_L
2	VB-	DI_5
3	CAN_H	DI_1
4	CAN_L	VJ-
5	AI_4	AI_3
6	AI_5	AI_2
7	VK+	AI_1
8	VK+	VJ+
9	OUT_2	DI_2
10	OUT_3	DI_3
11	OUT_4	DI_4
12	OUT_1	DI_6

Mating connectors	
Name	Type
DM1	DTM06-12S Deutsch
DM2	DTM06-12SB Deutsch

CED040 control unit code	
Code	183360009
Description	CED040/WALVOIL/PHC040P-12V/v5.00
Notes	Supply voltage 12V, 2 ON-OFF functions (4 outputs - 5A)
Code	183360010
Description	CED040/WALVOIL/PHC250C-12V/v6.00
Notes	Supply voltage 12V, 3 ON-OFF outputs (5A)

System diagram

CED040/PHC040P configuration



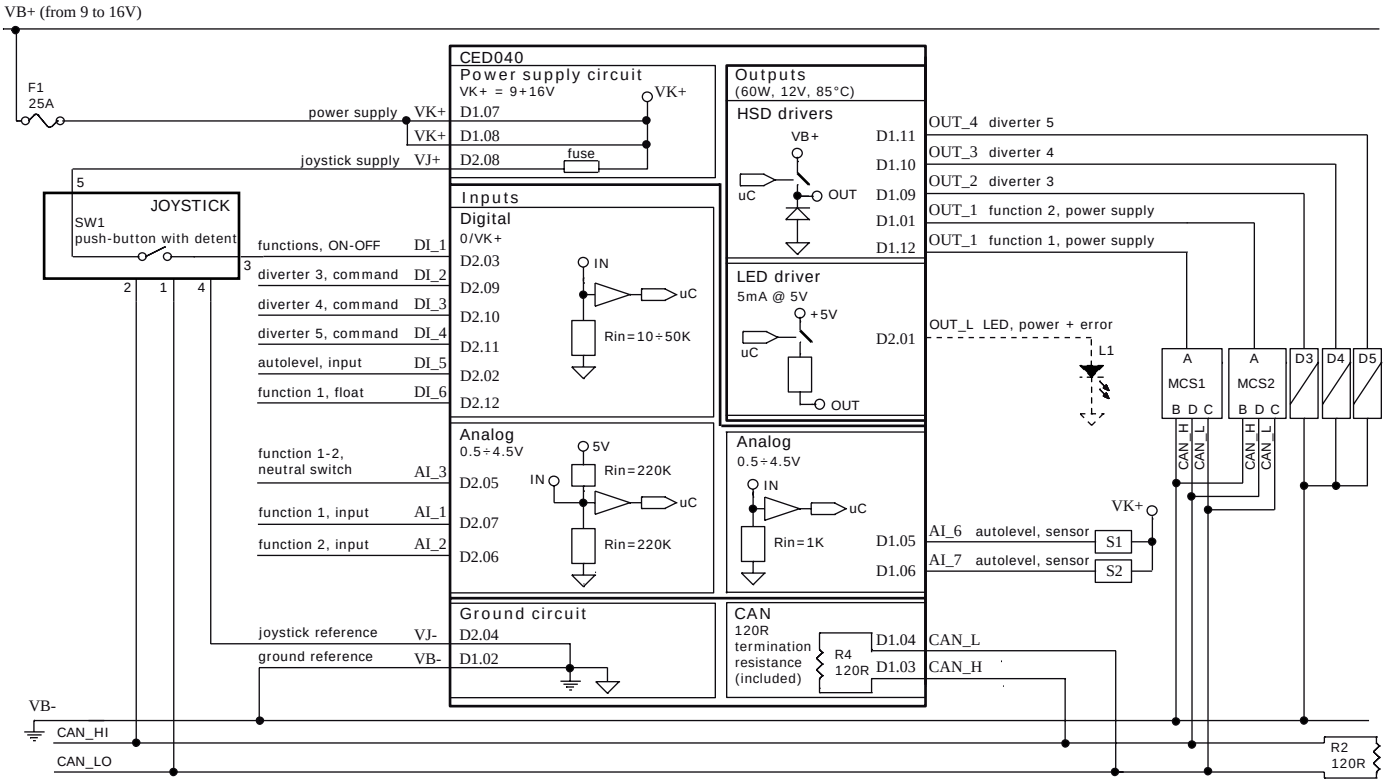
CED040 electronic control unit

System diagram

CED040/PHC250C configuration

The CED040 control unit is also available in dedicated configuration for front loader application, for SDM122/DLM22 series with mechatronic control.

For information, please contact our Sales Department.



CED160 electronic control unit

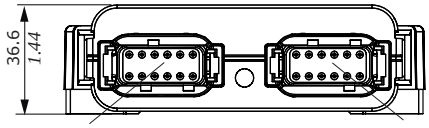
- 12VDC applications
- 'Dead man' switch management
- Float function management
- Fast/Slow function management
- One proportional function control (1 input / 2 outputs)
- Six digital outputs control (through six relays)
- Designed for PHC electronic systems

Working conditions	
General features	**CED160**
Supply voltage	from 9 to 16 V
Current consumption	50 mA (no-load current) 15A (max. supply)
Max. current output	7.5 A
Interface	CAN 2.0 A - B, 125-250 Kbit/sec
EMC compatibility	150 V/m - ISO13766, ISO14982
Environmental compatibility	IEC60068-2-6/27/29
Working temperature	from -40 to +85°C (*from -40°F to 185°F)*
Protection degree	IP67 with mating connector attached
Weight	0.3 Kg *(0.66 lb)*
Analog inputs	
Number	3
Signal type	from 0.5 to 4.5 V
Digital inputs	
Number	6
Signal type	0/VB
Proportional outputs	
Number	1 couple
Type	HSD*
Signal	PWM
Frequency	from 50 to 300 Hz
Max. load	2 A
ON / OFF outputs	
Number	6
Signal type	relay (HSD*)
Max. load	7.5 A

NOTE (*): HSD - High Side Driver
LSD - Low Side Driver

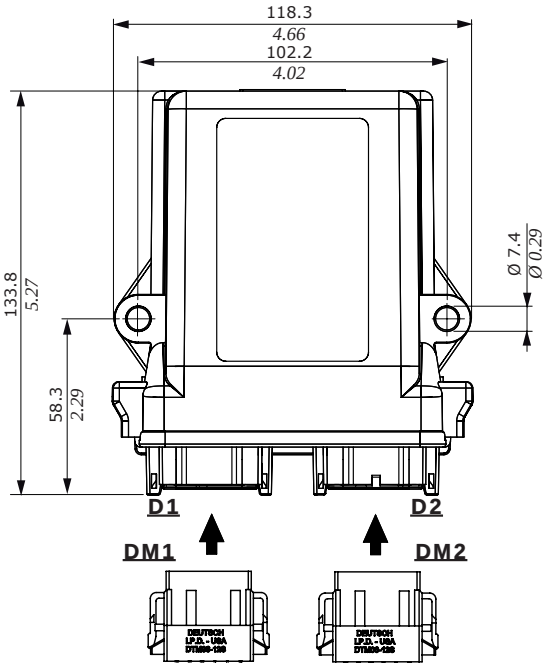
CED160 electronic control unit

Dimensions and pin-out

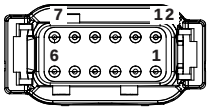


DTM13-12PB
Deutsch connector

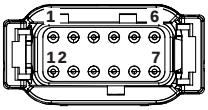
DTM13-12PA
Deutsch connector



D1 connector



D2 connector



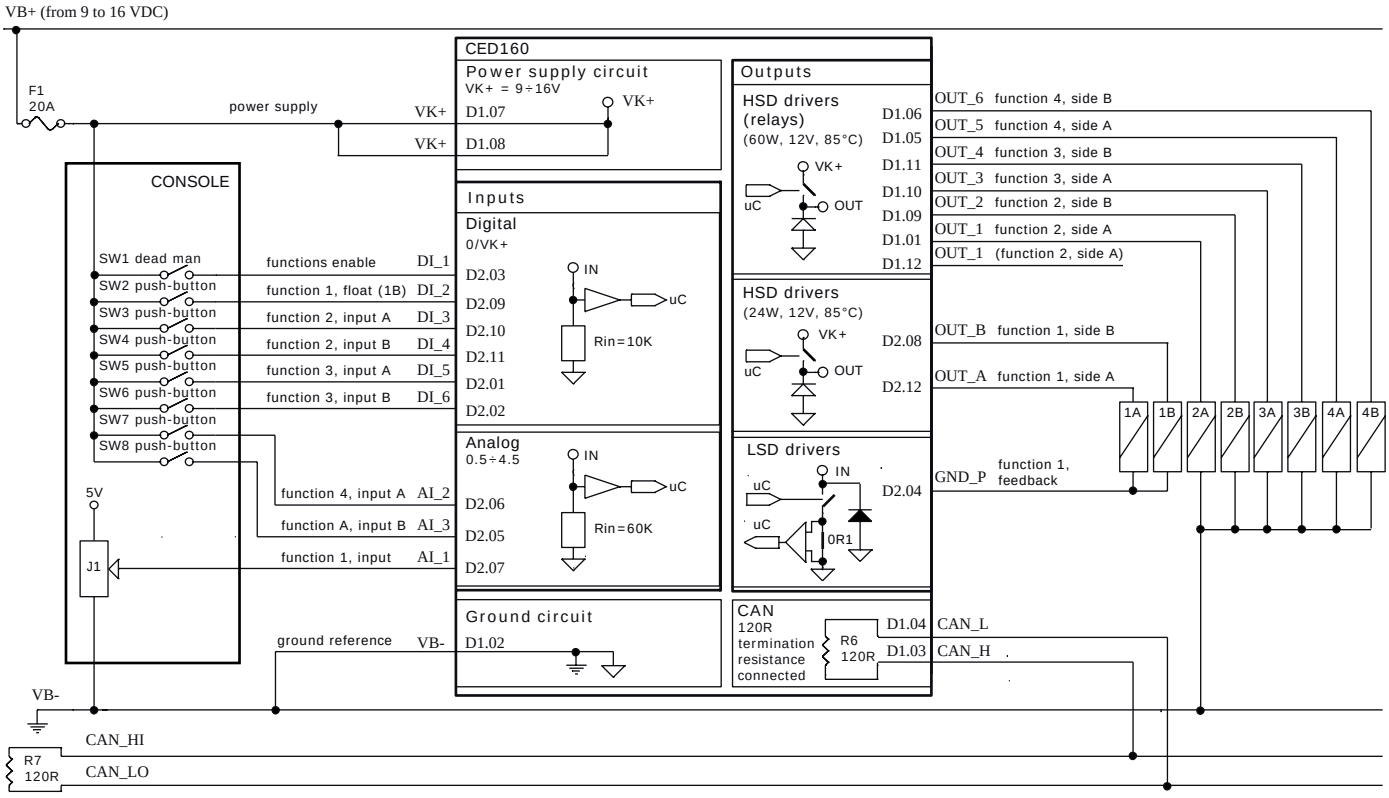
Connector PIN-OUT		
Pin	Function	
	D1 connector	D2 connector
1	OUT_1	DI_5
2	VB-	DI_6
3	CAN_H	DI_1
4	CAN_L	GND_P
5	OUT_5	AI_3
6	OUT_6	AI_2
7	VK+	AI_1
8	VK+	OUT_B
9	OUT_2	DI_2
10	OUT_3	DI_3
11	OUT_4	DI_4
12	OUT_1	OUT_A

Mating connectors	
Name	Type
DM1	DTM06-12S Deutsch
DM2	DTM06-12SB Deutsch

CED160 control unit code	
Code	183360008
Description	CED160/WALVOIL/PHC160F-12V/v4.00
Notes	Supply voltage 12V, 1 prop. function (2 outputs - 2A), 3 ON-OFF functions (6 outputs - 5A)

System diagram

Standard circuit configuration

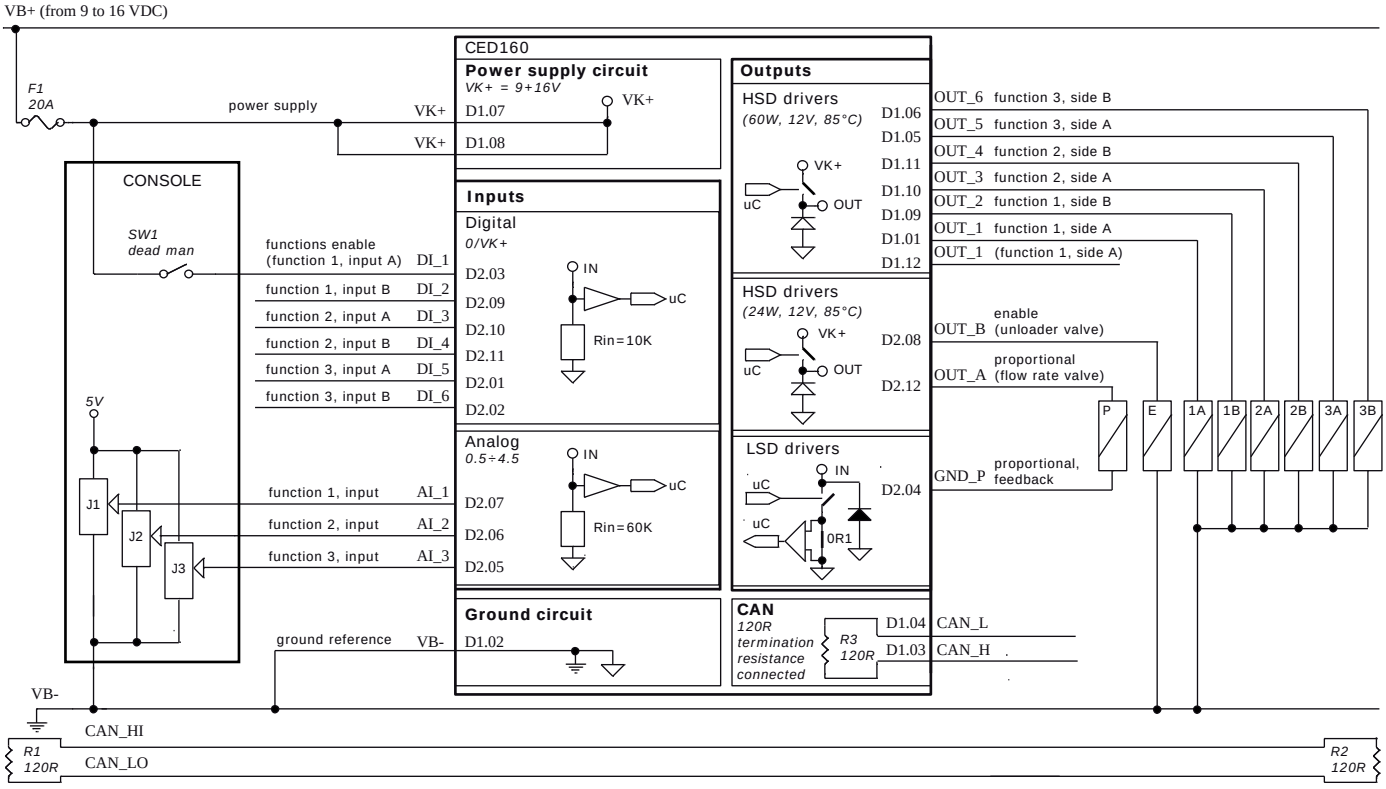


CED160 electronic control unit

System diagram

Specific circuit configuration

The CED160 control unit is also available in dedicated configuration for the SDE series with direct acting solenoid control.
For information, please contact our Sales Department.



CED252 electronic control unit

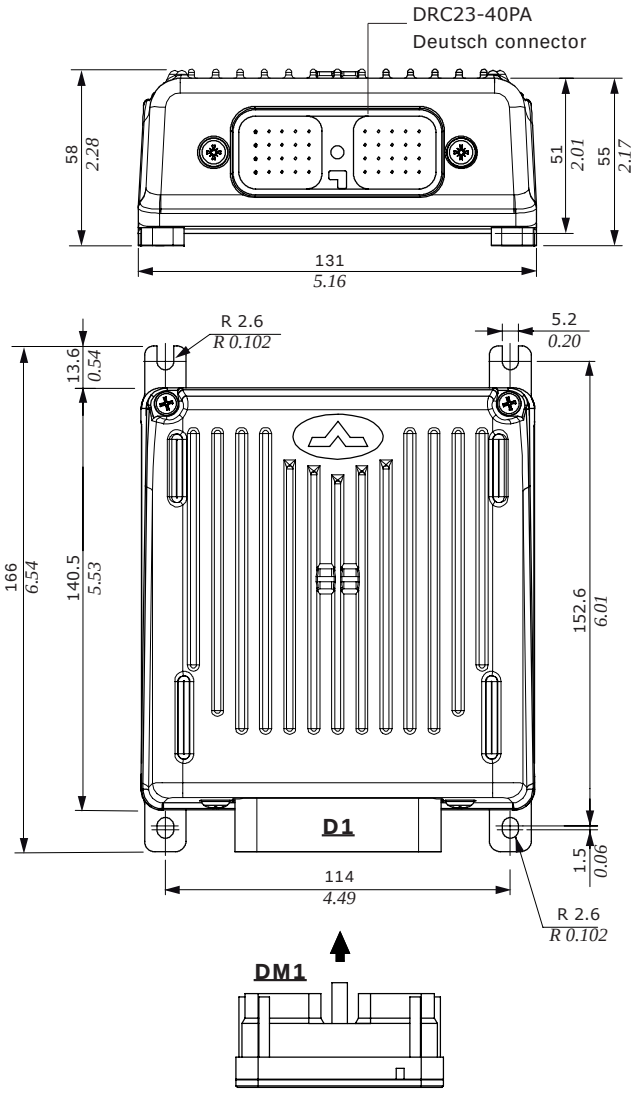
- 12VDC applications
- 'Dead man' switch management
- Float function management
- Automatic function management
- Two proportional function controls (3 inputs / 4 outputs)
- Five digital output controls
- Designed for front-end loader applications

Working conditions	
General features	**CED252**
Supply voltage	from 9 to 16 V
Current consumption	> 100 mA
Max. current output	21 A - 12 VDC
Interface	RS232, 9600, 8, n, 1 CAN 2.0 A - B, 125-250 Kbit/sec
EMC compatibility	200 V/m - ISO13766, ISO14982, 2000/2/EC, CE
Environmental compatibility	IEC60068-2-6/27/29
Working temperature	from -40 to +85°C (*from -40°F to 185°F)*
Protection degree	IP67
Weight	0.8 Kg *(1.8 lb)*
Analog inputs	
Number	up to 11
Signal type	up to 6, from 0 to 30 VDC up to 5, from 0 to 5 VDC
Digital inputs	
Number	1
Signal type	from 0 to 30 VDC
Proportional outputs	
Number	5 x HSD
Signal type	PWM - (HSD*)
Frequency	100-150-220 Hz
Max. load	5 x 2A
ON / OFF outputs	
Number	5 x HSD*
Signal type	0/VB
Max. load	5 A

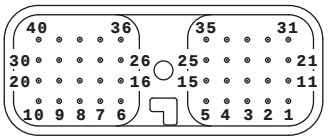
NOTE (*): HSD - High Side Driver

CED252 electronic control unit

Dimensions and pin-out



D1 connector



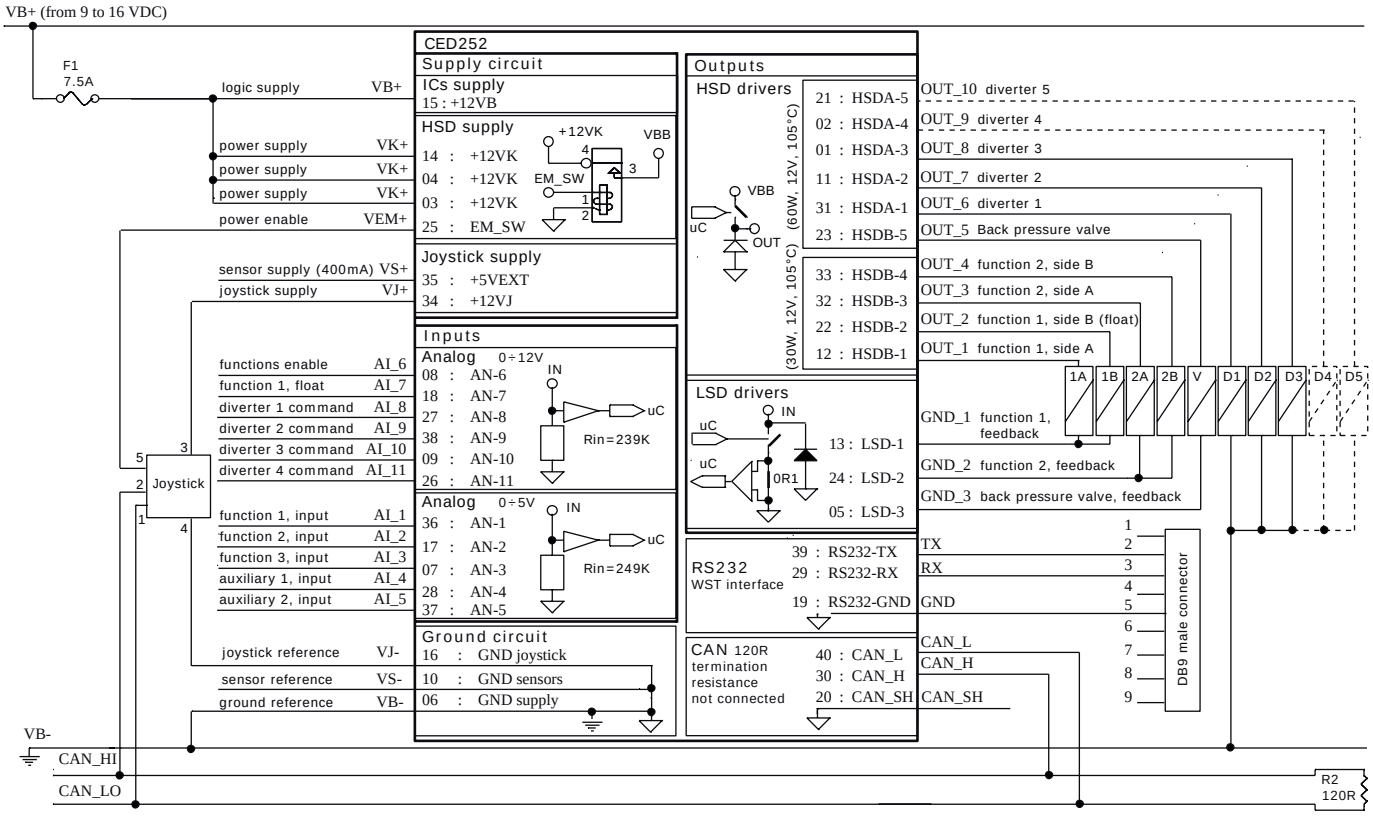
D connector PIN-OUT							
Pin	function	Pin	function	Pin	function	Pin	function
1	OUT_8	11	OUT_7	21	OUT_10	31	OUT_6
2	OUT_9	12	OUT_1	22	OUT_2	32	OUT_3
3	VK+	13	GND_1	23	OUT_5	33	OUT_4
4	VK+	14	VK+	24	GND_2	34	VJ+
5	GND_3	15	VB+	25	VEM+	35	VS+
6	VB-	16	VJ-	26	AI_11	36	AI_1
7	AI_3	17	AI_2	27	AI_8	37	AI_5
8	AI_6	18	AI_7	28	AI_4	38	AI_9
9	AI_10	19	GND	29	RX	39	TX
10	VS-	20	CAN_SH	30	CAN_H	40	CAN_L

Mating connectors	
Name	Type
DM1	DRC26-40SA Deutsch

CED252 control unit code	
Code	183350025
Description	CED252/WALVOIL/PHC251C/v4019
Notes	Supply voltage 12V, 2 prop. function (4 outputs - 2A), 3 ON-OFF outputs (5A)

CED252 electronic control unit

System diagram



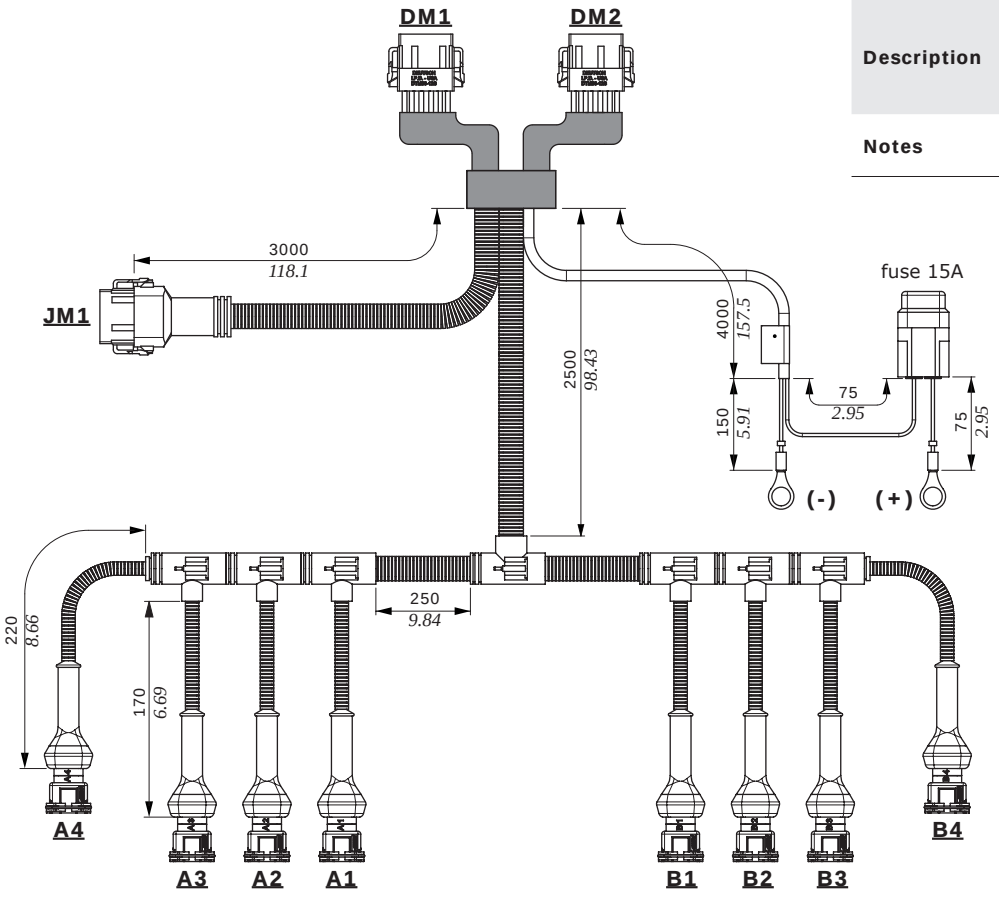
Harnesses

- Dedicated to predefined PHC systems
- Power-line connection with fuse protection
- Suitable for static or fixed installation

Working conditions		
General features		
Working temperature		from -30°C to 105°C (*from -22°F to 221°F*)
Working features		fixed laying, motor, agricultural and civil environment
Electrical insulation	rule	CEI 20-11, R3 type
	directive	2000/53/CE
Conductor section		DIN 72551-6, A and B type
Max. load current (continuative)	AWG22	up to 1 A
	AWG20	up to 2.5 A
	AWG17	up to 5 A
	AWG15	up to 10 A
	AWG13	up to 20 A
Connectors		
Toward control units		tin plated
Toward joysticks		tin plated
Toward solenoid valves		tin plated

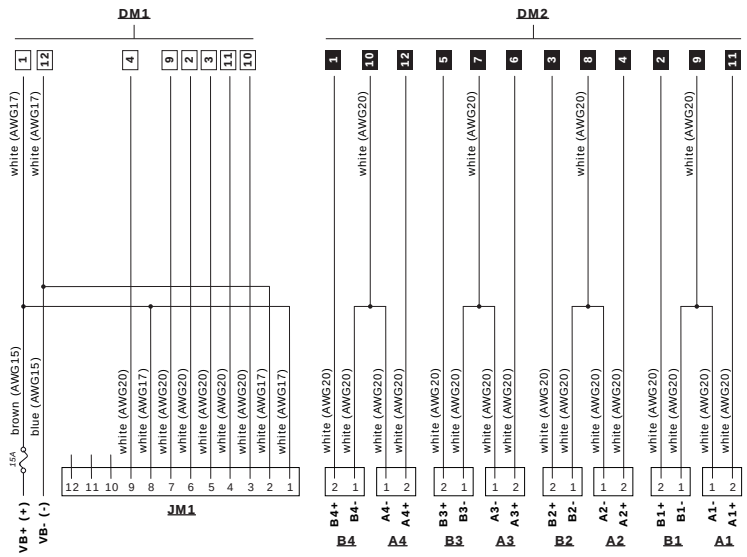
KCD04-PHC400F

Dimensions and wiring



KCD04-PHC400F harness	
Code	**183480118**
Description	KCD04/(D2M12-D2M12)-01D2M12300(TC)-02(4)T1F02300(TC)-03(4)T102300(TC)-AU1F15400(TC)
Notes	AJW and CED400X connection, for 4 proportional functions

Electrical wiring



Connector types		
ID	**Connection to**	**Type**
DM1	CED	DTM06-12S Deutsch
DM2	CED	DTM06-12SB Deutsch
JM1	Joystick	DTM06-12S Deutsch
A1 to B4	proportional solenoid valves	AMP JPT, 2 poles

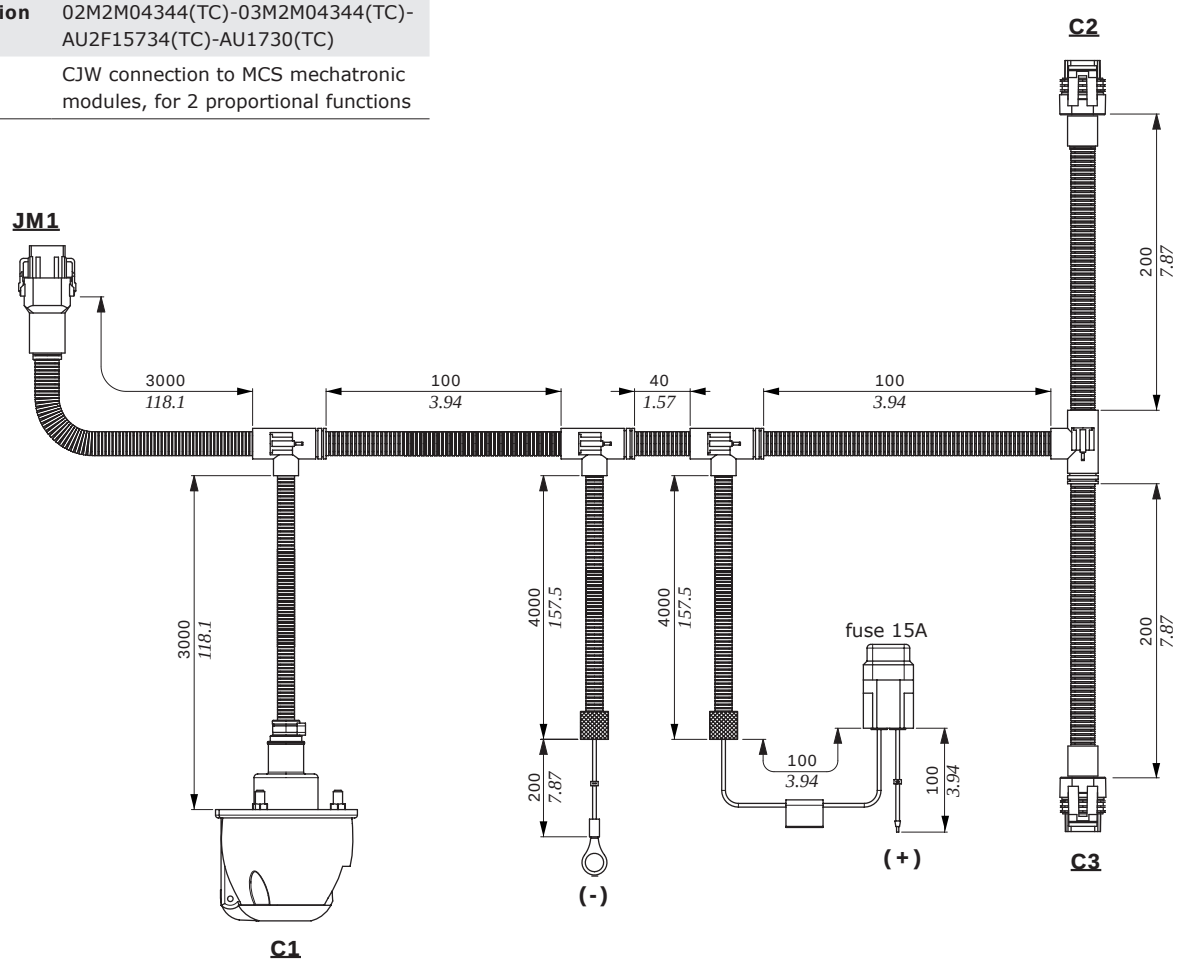
Connector PIN-OUT

Pin	DM1 connector		DM2 connector		JM1 conn.
	Name	Function	Name	Function	Function
1	VK+	VK+	OUT_8	B4+	VJ+
2	AI_4	joystick 4	OUT_2	B1+	VJ-
3	AI_3	joystick 3	OUT_4	B2+	joystick 1
4	DI_1	dead man	OUT_3	A2+	joystick 2
5	plugged	plugged	OUT_6	B3+	joystick 3
6	plugged	plugged	OUT_5	A3+	joystick 4
7	plugged	plugged	GND_3	A3- / B3-	float
8	plugged	plugged	GND_2	A2- / B2-	VJ+
9	DI_2	float	GND_1	A1- / B1-	dead man
10	AI_1	joystick 1	GND_4	A4- / B4-	plugged
11	AI_2	joystick 2	OUT_1	A1+	plugged
12	VB-	VB-	OUT_7	A4+	plugged

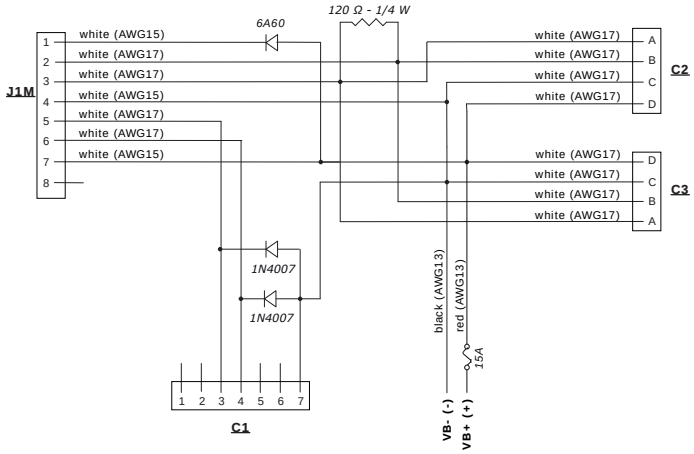
KCD05-PHC210C

Dimensions and wiring

KCD05-PHC210C harness	
Code	**183480165**
Description	KCD05/D2M06-01CCF07600(TC)-02M2M04344(TC)-03M2M04344(TC)-AU2F15734(TC)-AU1730(TC)
Notes	CJW connection to MCS mechatronic modules, for 2 proportional functions



Electrical wiring



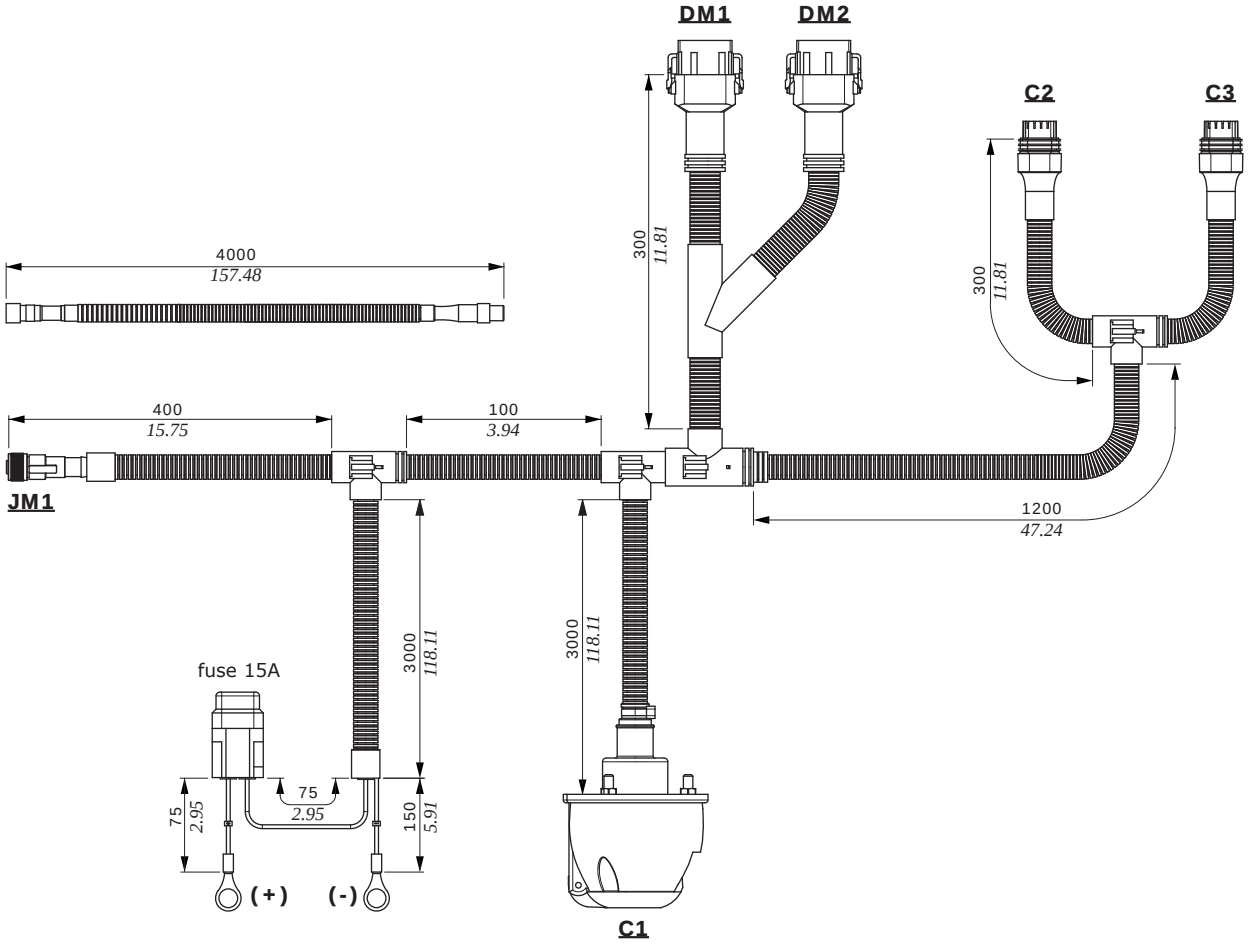
Connector types		
ID	**Connection to**	**Type**
C1	ON/OFF valves	8JB001941002 Hella
JM1	Joystick	DTM06-6S Deutsch
C2+C3	Mechatronic modules	M-PACK150_2 Packard, 4 poles

Connectors PIN-OUT			
Pin	**Functions**		
	C1 conn.	**JM1 conn.**	**C2+C3 conn.**
1	not connected	VK+	CAN_H
2	not connected	CAN_L	CAN_L
3	ON-OFF 3	CAN_L	VB-
4	ON-OFF 4	VB-	VB+
5	plugged	ON-OFF 3	/
6	plugged	ON-OFF 4	/
7	VB-	VJ+	/
8	/	plugged	/

KCD05-PHC250C

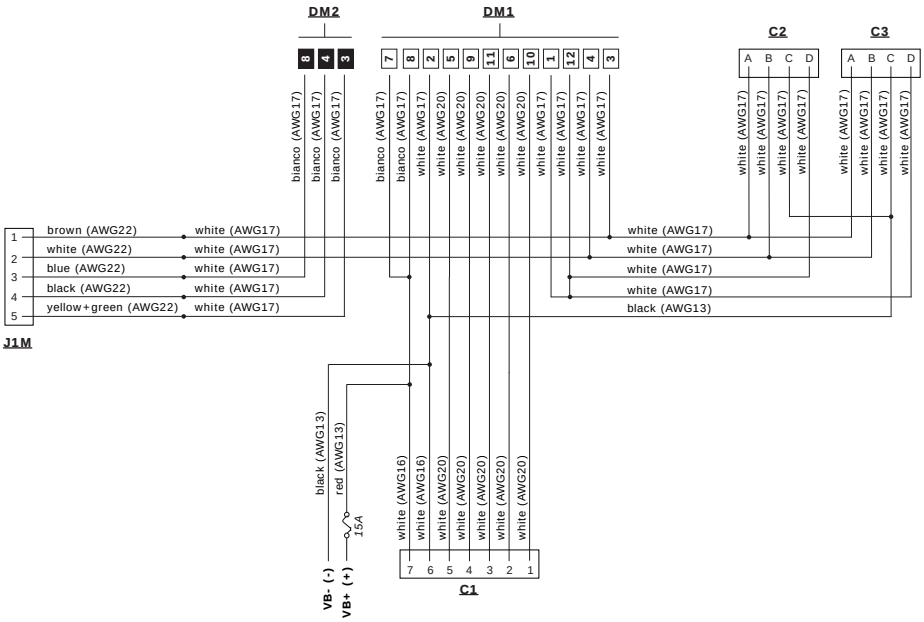
Dimensions and wiring

KCD05-PHC250C harness	
Code	**183480118**
Description	KCD05/(D2M12-D2M12)-01F1F05080(TC)-02CCF07330(TC)-03M2M04180(TC)-04M2M04180(TC)-AU1F15350(TC)
Note	CJW, CED040 and MCS mechatronic modules connection, for 2 proportional functions
Code	**183490001**
Description	F1M05-F1F05(TC) L=4m (*157.48 in*)
Note	extension for CJW connection



Connector types		
ID	**Connection to**	**Type**
DM1	CED	DTM06-12S Deutsch
DM2	CED	DTM06-12SB Deutsch
JM1	Joystick	5 poles M12 - female
C1	ON/OFF valves	8JB001941002 Hella
C2+C3	Mechatronic modules	M-PACK150_2 Packard, 4 poles

Dimensions and wiring

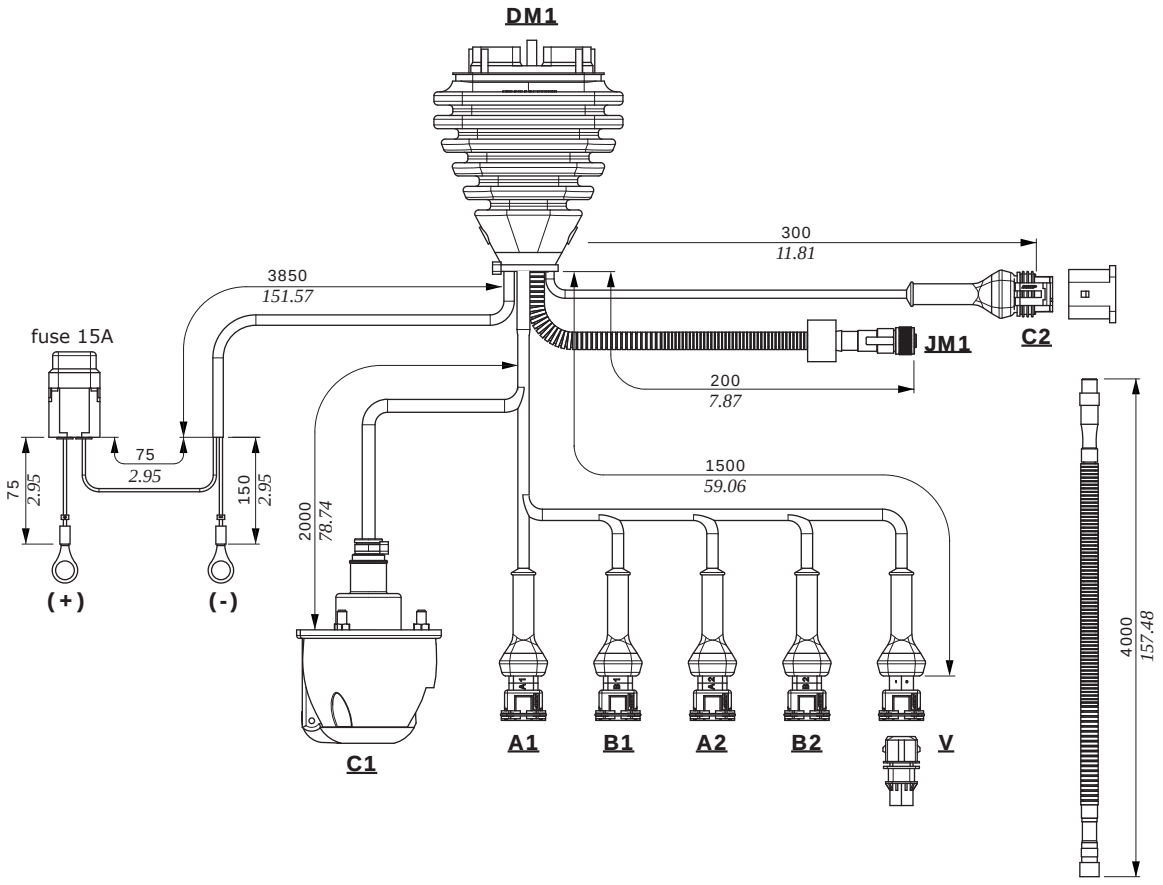


Connectors PIN-OUT							
Pin	DM1 connector		DM2 connector		JM1 conn.	C1 conn.	C2+C3 con.
	Name	Function	Name	Function	Function	Function	Function
1	OUT_1	OUT_1	OUT_L	plugged	CAN_H	ON-OFF 1	CAN_H
2	VB-	GND	DI_5	plugged	CAN_L	sensor 1	CAN_L
3	CAN_H	CAN_H	DI_1	VB ON-OFF	VJ+	ON-OFF 2	VB-
4	CAN_L	CAN_L	VJ-	GND joy	VJ-	ON-OFF 3	VB+
5	AI_6	sensor 1	AI_3	plugged	VK+	sensor 2	/
6	AI_7	sensor 2	AI_2	plugged	/	VB-	/
7	VK+	VB+	AI_1	plugged	/	VK+	/
8	VK+	VB+	VJ+	VB+ joy	/	/	/
9	OUT_2	ON-OFF 3	DI_2	plugged	/	/	/
10	OUT_3	ON-OFF 4	DI_3	plugged	/	/	/
11	OUT_4	ON-OFF 5	DI_4	plugged	/	/	/
12	OUT_1	OUT_1	DI_6	plugged	/	/	/

KCD09-PHC251C

Dimensions and wiring

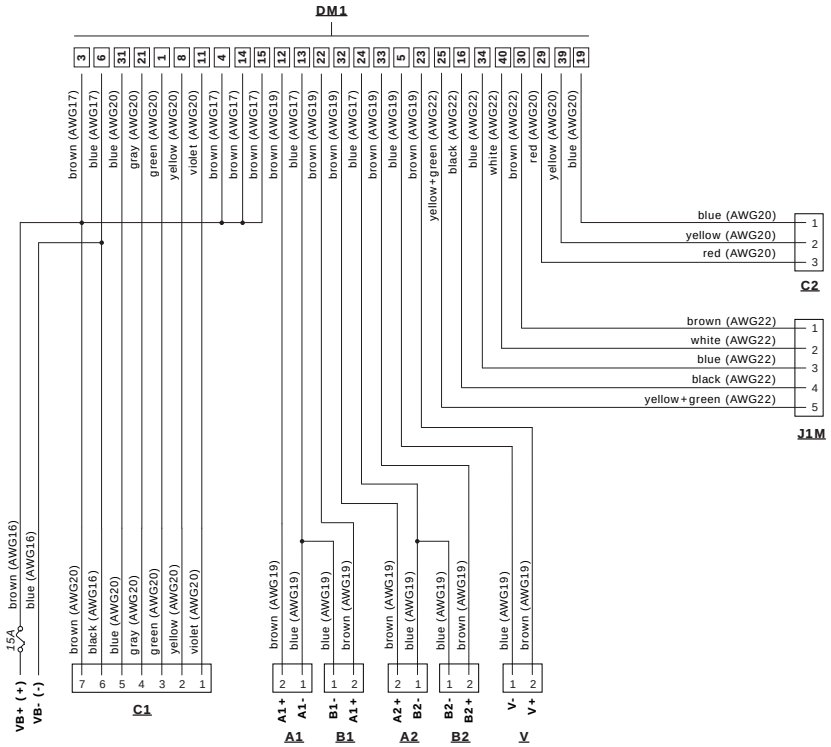
KCD09-PHC251C harness	
Code	**183480167**
Description	KCD09/CD3F40(SOF)-01T1F02150-02T1F02150-03T1F02150-04T1F02150-05T1F02150(TAP)-06CCF07200-07F1F05020(TC)-08A1M03030(TAP)-AU1F15400
Note	CJW and CED252 connection, for 2 proportional functions
Code	**183490001**
Description	F1M05-F1F05(TC) L=4m (*157.48 in*)
Note	extension for CJW connection



Connector types		
ID	**Connection to**	**Type**
DM1	CED	DRC26-40SA Deutsch
JM1	Joystick	5 poles M12 - female
C1	ON/OFF valves	8JB001941002 Hella
C2	programmazione	Superseal AMP, 3 poles, male
A1-B1 A2-B2 V	proportional solenoid valves	JPT AMP, 2 poles

KCD09-PHC251C

Dimensions and wiring



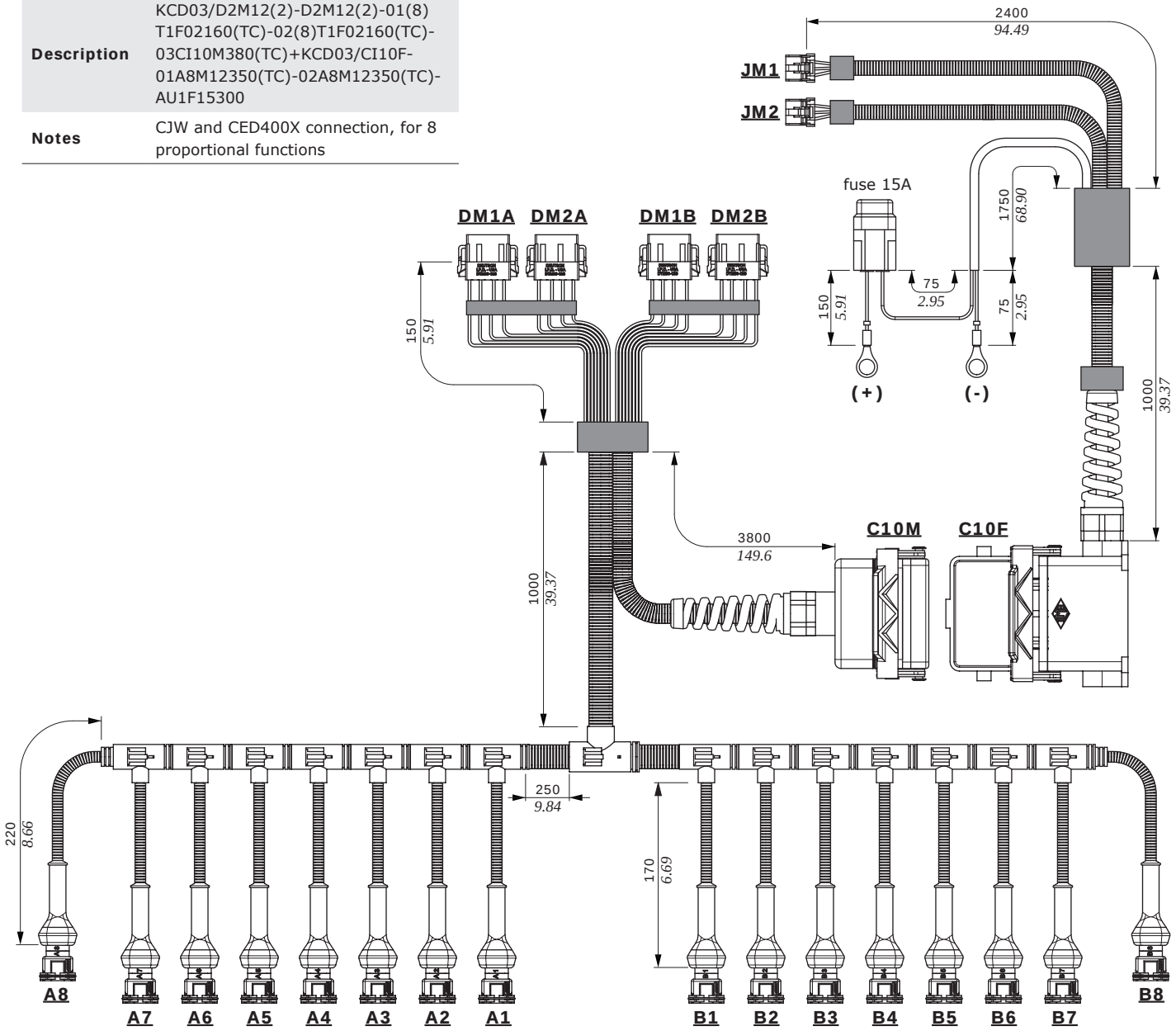
Connectors PIN-OUT			
Pin	JM1 conn.	C1 conn.	C2 conn.
	Function	Function	Function
1	CAN_H	ON-OFF 1	RS232-GND
2	CAN_L	sensor 1	RS232-Tx
3	VJ+	ON-OFF 2	RS232-Rx
4	VJ-	ON-OFF 3	/
5	EM-SW	sensor 2	/
6	/	VB-	/
7	/	VK+	/

DM1 connector PIN-OUT											
Pin	Name	Function	Pin	Name	Function	Pin	Name	Function	Pin	Name	Function
1	OUT_8	ON-OFF 2	11	OUT_7	ON-OFF 1	21	OUT_10	ON-OFF 3	31	OUT_6	sensor 2
2	OUT_9	non coll.	12	OUT_1	A1+	22	OUT_2	B1+	32	OUT_3	A2+
3	VK+	VK+	13	GND_1	A1- / B1-	23	OUT_5	V+	33	OUT_4	B2+
4	VK+	VK+	14	VK+	VK+	24	GND_2	A2- / B2-	34	VJ+	VJ+
5	GND_3	V-	15	VB+	VB+	25	VEM+	EM-SW	35	VS+	non coll.
6	VB-	GND	16	VJ-	VJ-	26	AI_11	not conn.	36	AI_1	non coll.
7	AI_3	not conn.	17	AI_2	not conn.	27	AI_8	not conn.	37	AI_5	non coll.
8	AI_6	sensor 1	18	AI_7	not conn.	28	AI_4	not conn.	38	AI_9	non coll.
9	AI_10	not conn.	19	GND	RS232-GND	29	RX	RS232-Rx	39	TX	RS232-Tx
10	VS-	not conn.	20	CAN_SH	not conn.	30	CAN_H	CAN_H	40	CAN_L	CAN_L

KCD03+KCD03-PHC640C

Dimensions and wiring

KCD03+KCD03-PHC640C harness	
Code	**183480169**
Description	KCD03/D2M12(2)-D2M12(2)-01(8) T1F02160(TC)-02(8)T1F02160(TC)-03CI10M380(TC)+KCD03/CI10F-01A8M12350(TC)-02A8M12350(TC)-AU1F15300
Notes	CJW and CED400X connection, for 8 proportional functions



Connector types		
ID	**Connection to**	**Type**
DM1A+DM1B	CED	DTM06-12S Deutsch
DM2A+DM2B	CED	DTM06-12SB Deutsch
C10M	cable extension	CNM10+CHV10L+CHC10LG IIme
C10F	cable extension	CNF10+CHP10LS IIme
JM1+JM2	joystick	Multilock 040 series Tyco, 12 poles
A1 to B8	proportional solenoid valves	JPT AMP, 2 poles

KCD03+KCD03-PHC640C

Dimensions and wiring

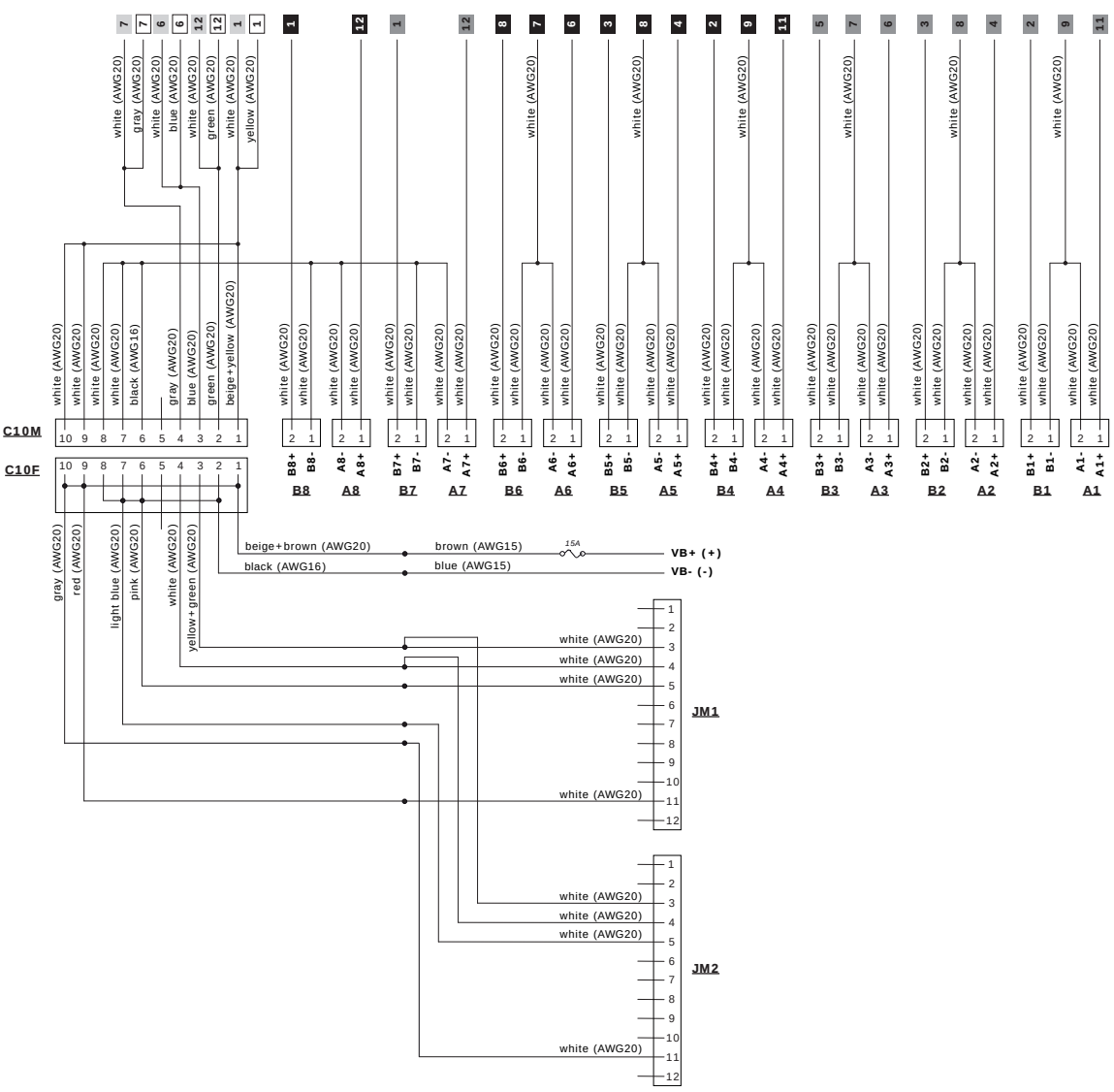
1 DM1A connector

1 DM2A connector

1 DM1B connector

1 DM2B connector

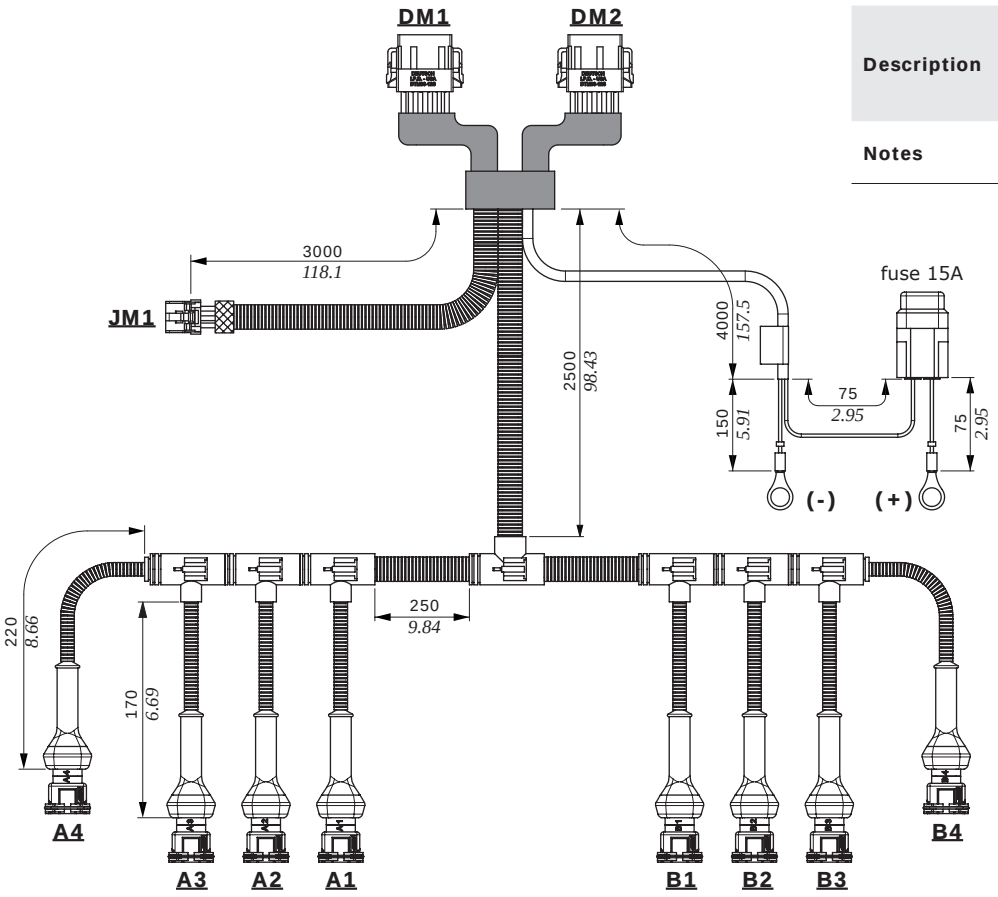
Electrical wiring



Pin	Connector PIN-OUT									
	DM1A connector		DM2A connector		DM1B connector		DM2B connector		JM1+JM2 con.	C10M+C10F con.
	Name	Function	Name	Function	Name	Function	Name	Function	Function	Function
1	VK+	VK+	OUT_8	B7+	VK+	VK+	OUT_8	B8+	not connected	VK+
2	plugged	plugged	OUT_2	B1+	plugged	plugged	OUT_2	B4+	not connected	VB-
3	plugged	plugged	OUT_4	B2+	plugged	plugged	OUT_4	B5+	CAN_L	CAN_L
4	plugged	plugged	OUT_3	A2+	plugged	plugged	OUT_3	A5+	CAN_H	CAN_H
5	plugged	plugged	OUT_6	B3+	plugged	plugged	OUT_6	B6+	VJ-	not connected
6	CAN_L	CAN_L	OUT_5	A3+	CAN_L	CAN_L	OUT_5	A6+	not connected	VB-
7	CAN_H	CAN_H	GND_3	A3- / B3-	CAN_H	CAN_H	GND_3	A6- / B6-	not connected	VB-
8	plugged	plugged	GND_2	A2- / B2-	plugged	plugged	GND_2	A5- / B5-	not connected	VB-
9	plugged	plugged	GND_1	A1- / B1-	plugged	plugged	GND_1	A4- / B4-	not connected	VJ+
10	plugged	plugged	GND_4	plugged	plugged	plugged	GND_4	plugged	not connected	VJ+
11	plugged	plugged	OUT_1	A1+	plugged	plugged	OUT_1	A4+	VJ+	/
12	VB-	VB-	OUT_7	A7+	VB-	VB-	OUT_7	A8+	VJ-	/

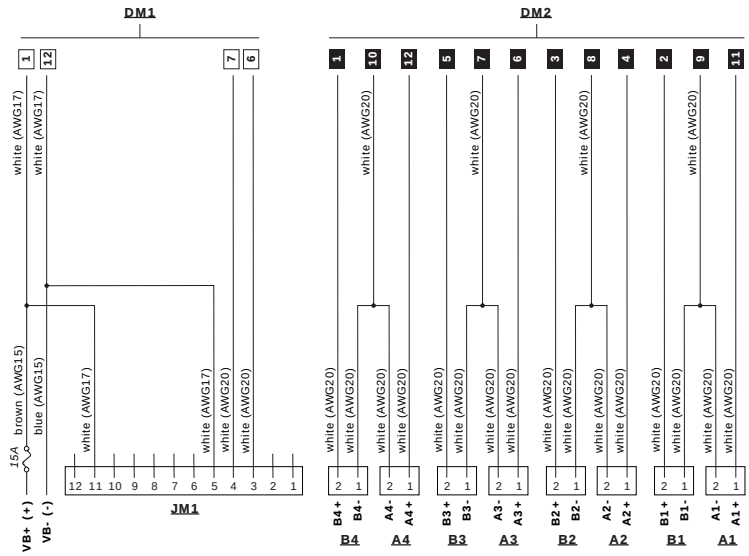
KCD04-PHC400C

Dimensions and wiring



KCD04-PHC400C harness	
Code	**183480168**
Description	KCD04/(D2M12-D2M12)-01A8M12300(TC)-02(4) T1F02300(TC)-03(4)T102300(TC)-AU1F15400(TC)
Notes	CJW and CED400X connection, for 4 proportional functions

Electrical wiring



Connector types		
ID	**Connection to**	**Type**
DM1	CED	DTM06-12S Deutsch
DM2	CED	DTM06-12SB Deutsch
JM1	Joystick	Multilock Series 040 Tyco, 12 poles
A1 - B4	Proportional solenoid valves	JPT AMP, 2 poli

Connector PIN-OUT					
Pin	**DM1 connector**		**DM2 connector**		**JM1 con.**
	Name	**Function**	**Name**	**Function**	**Function**
1	VK+	VK+	OUT_8	B4+	not conn.
2	plugged	plugged	OUT_2	B1+	not conn.
3	plugged	plugged	OUT_4	B2+	CAN_L
4	plugged	plugged	OUT_3	A2+	CAN_H
5	plugged	plugged	OUT_6	B3+	VJ-
6	CAN_L	CAN_L	OUT_5	A3+	not conn.
7	CAN_H	CAN_H	GND_3	A3- / B3-	not conn.
8	plugged	plugged	GND_2	A2- / B2-	not conn.
9	plugged	plugged	GND_1	A1- / B1-	not conn.
10	plugged	plugged	GND_4	A4- / B4-	not conn.
11	plugged	plugged	OUT_1	A1+	VJ+
12	VB-	VB-	OUT_7	A4+	not conn.

Accessories

- Preassembled connector kits for the control unit interface
- Preassembled connector kits for the joystick interface
- Preassembled connector kits for the solenoid valve interface
- Control unit programming cables
- Spool position sensors
- Control unit programming software

Programming cables

These cables are used to connect a personal computer running our WST software to the electronic control unit for the directional control valve.

The programming cable is installed between the electronic control unit (D1 connector) and the harness (D1A connector), as shown in the picture.

Cable kit

In addition to the pre-configured cables of the KCD series, Walvoil offers the opportunity to assemble custom cables.

Using the suitable pre-assembled connector kit, you can meet the needs of connecting electronic components and electro-proportional controls on Walvoil directional valves.

Spool position sensors

Accuracy, reliability and repeatability are the main features of Walvoil position sensors.

On/off type, linear analog or Can bus, they find their natural application as spool position control on the controls in the directional valve range.

Control unit programming software (Walvoil Service Tool)

CED series electronic control units are programmed in the Company with default operating parameters, suitable for most applications.

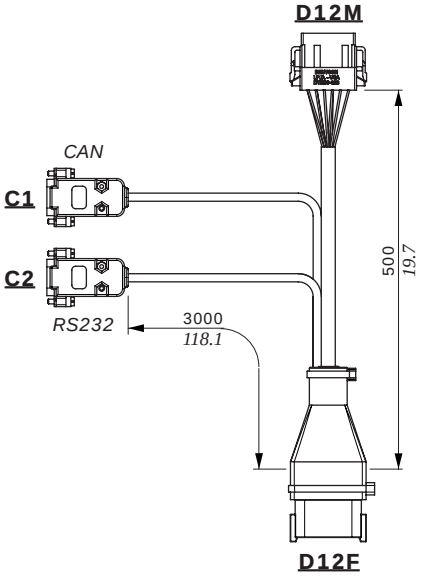
For special applications, WST software can be used together with a personal computer to optimize the control parameters for the electrohydraulic modules.

Programming cables

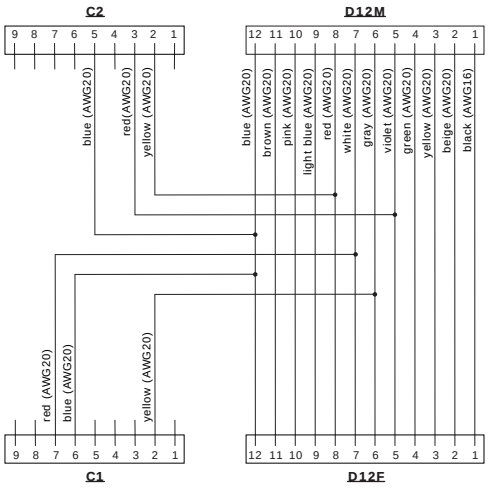
For CED100X-400X control units

Code	**VCAV600018**
Description	CED100X-400X programming cable
Notes	RS232 and CAN bus programming

Connector types		
ID	**Type**	**Connection to**
D12M	DTM06-12S Deutsch	CED100X - CED400X control units
D12F	DTM04-12P Deutsch	Harness
C1+C2	SUB-D 9 poles, female	Personal computer



Electrical wiring

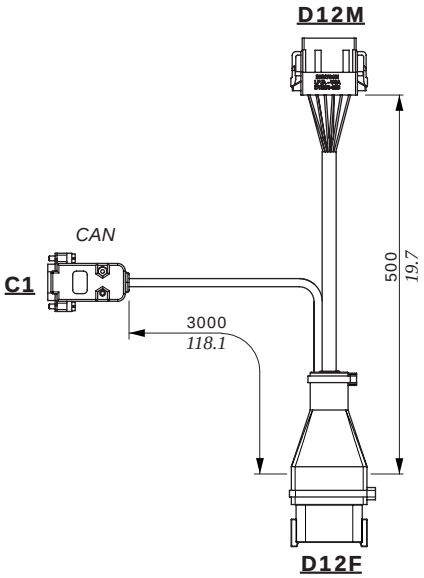


Connector PIN-OUT		
Pin	**Functions**	
	C1 conn.	**C2 conn.**
1	not connected	not connected
2	CAN_L	Tx
3	not connected	Rx
4	not connected	not connected
5	not connected	GND
6	GND	not connected
7	CAN_H	not connected
8	not connected	not connected
9	not connected	not connected

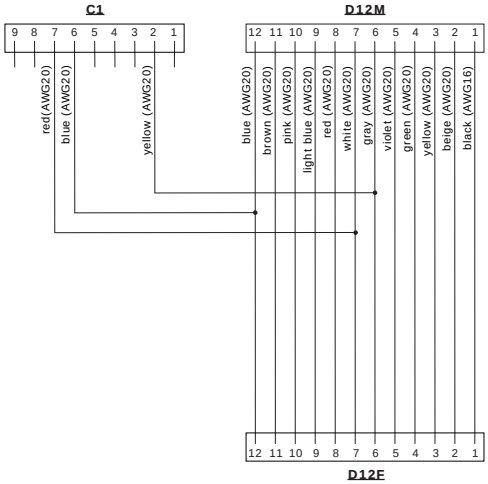
For CED160 control unit

Code	**VCAV600021**
Description	CED160 programming cable
Notes	CAN bus programming

Connector types		
ID	**Type**	**Connection to**
D12M	DTM06-12S Deutsch	CED160 control units
D12F	DTM04-12P Deutsch	Harness
C1	SUB-D 9 poles, female	Personal computer



Electrical wiring



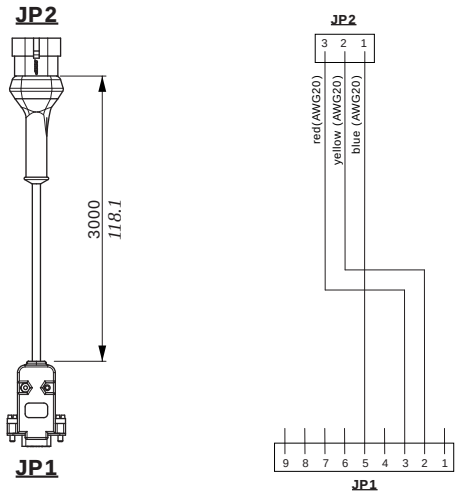
C1 connector PIN-OUT	
Pin	**Functions**
1	not connected
2	CAN_L
3	not connected
4	not connected
5	not connected
6	GND
7	CAN_H
8	not connected
9	not connected

Programming cables

For CED252 control unit

Code	**VCAV600014**
Description	CED252 programming cable
Notes	RS232 programming

Electrical wiring



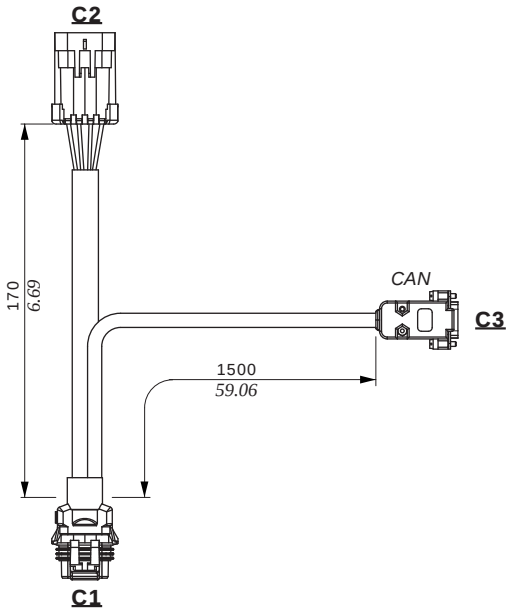
Connector PIN-OUT		
Pin	**Functions**	
	JP1 conn.	**JP2 conn.**
1	not connected	GND
2	Tx	Tx
3	Rx	Rx
4	not connected	/
5	GND	/
6	not connected	/
7	not connected	/
8	not connected	/
9	not connected	/

Connector types		
ID	**Type**	**Connection to**
JP1	SUB-D 9 poles, female	Personal computer
JP2	AMP Supereal, 3 poles	CED252 control unit

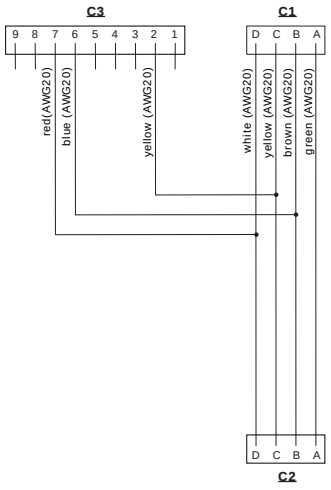
For MCS mechatronic modules

Code	**VCAV600020**
Description	MCS modules programming cable
Notes	CAN bus programming

Connector types		
ID	**Type**	**Connection to**
C1	M-PACK150_2 Packard, 4 poles	MCS mechatronic module
C2	M-PACK150_2 Packard, 4 poles	Harness
C3	SUB-D 9 poles, female	Personal computer

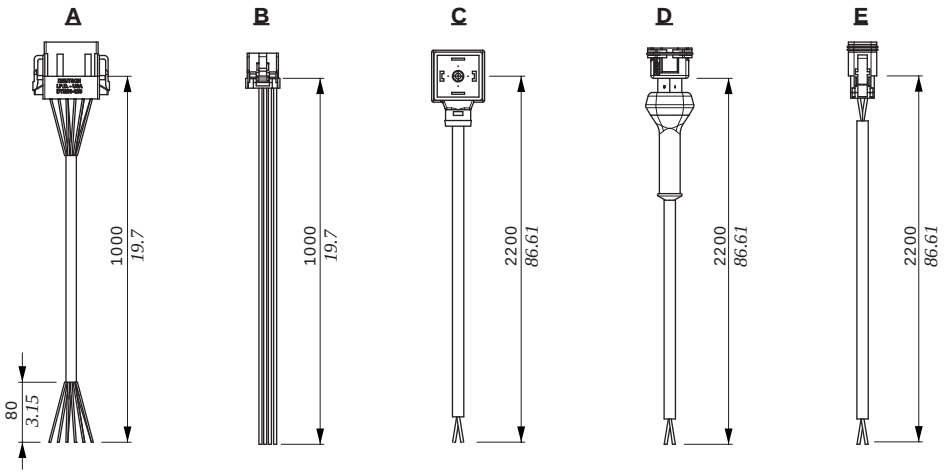


Electrical wiring



C3 connector PIN-OUT	
Pin	**Functions**
1	not connected
2	CAN_L
3	not connected
4	not connected
5	not connected
6	GND
7	CAN_H
8	not connected
9	not connected

Cable kit



Cable kit types			
ID	**Code**	**Connector**	**Connection to**
A	YCON140041	DTM06-12S Deutsch	CED100X-CED400X-CED040-CED160 control units, AJW joysticks
A	YCON140067	DTM06-12SB Deutsch	CED100X-CED400X-CED040-CED160 control units
B	YCON140073	Multilock series 040 Tyco	CJW joysticks
C	VCAV100008	ISO4400	Solenoid valves
D	VCAV100011	JPT AMP	Solenoid valves
E	VCAV100071	DT06-2S Deutsch	Solenoid valves

Wire colour and section					
Pin	**A cable**	**B cable**	**C cable**	**D cable**	**E cable**
1	brown (AWG20)	not connected	brown (AWG18) Valve -	blue (AWG18) Valve +	blue (AWG18) Valve +
2	white (AWG20)	not connected	blue (AWG18) Coil 1 +	brown (AWG18) Valve -	brown (AWG18) Valve -
3	violet (AWG20)	green (AWG20) CAN_H	black (AWG18) Coil 2 +	/	/
4	pink (AWG20)	yellow (AWG20) CAN_L	yellow green (AWG18) GND	/	/
5	red (AWG20)	black (AWG20) GND	/	/	/
6	gray (AWG20)	not connected	/	/	/
7	beige (AWG20)	not connected	/	/	/
8	blue (AWG20)	not connected	/	/	/
9	light blue (AWG20)	not connected	/	/	/
10	yellow (AWG20)	not connected	/	/	/
11	green (AWG20)	red (AWG20) VB+	/	/	/
12	black (AWG16)	gray (AWG20) GND	/	/	/

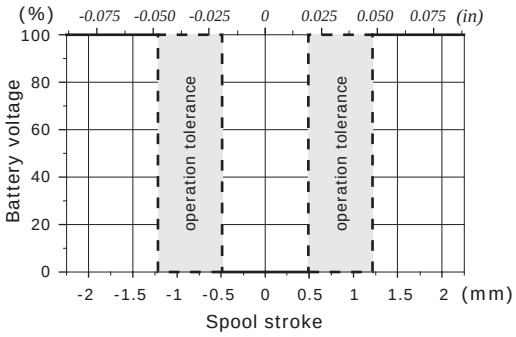
Spool position sensors

8MG type

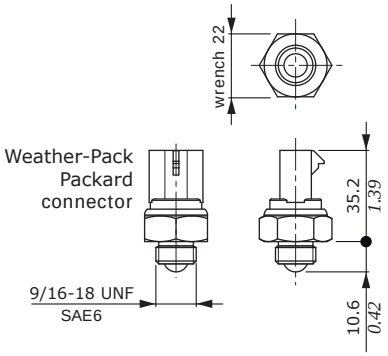
Precision ball switch for spool direction and neutral position detection, with NO and NC circuits in single and redundant configuration. This sensor is available on wide ranges of valves.
Main features are:
- wide output current range (10 mA to 5A);
- heavy duty construction, corrosion resistant;
- long mechanical life (10^6 cycles).

Working conditions		
Voltage rating		from 5 to 24 VDC
Current rating		from 10 mA to 5A
Electrical life		$5x10^5$
Mechanical life		10^6
Connector type	integrated	Packard Weather-Pack
	with flying leads	Packard Weather-Pack Deutsch DT series AMP Superseal
Weather protection		IP67
Working temperature		from -40°C to 120°C (*from -40°F to 248°F*)

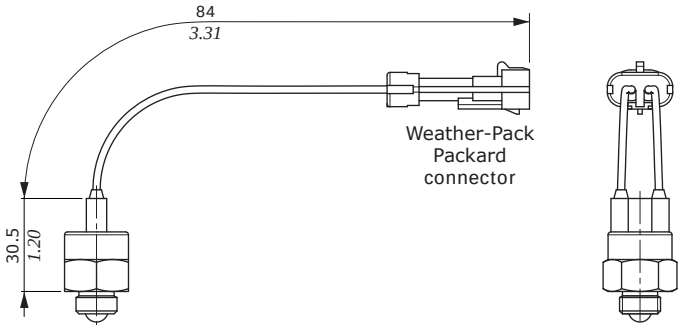
Output signal



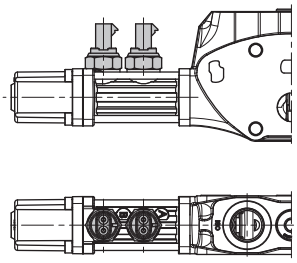
Sensor with integrated connector



Sensor with connector and flying leads



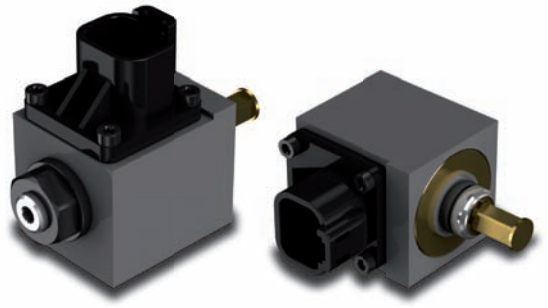
Example of sensor in 8MG control with SD8 working section



IMPORTANT: The sensor can be ordered exclusively through the controls assembled on the monoblock and sectional valves. These controls, in different configurations, are available on the full range of Walvoil directional valves.

Spool position sensors

SPSD type

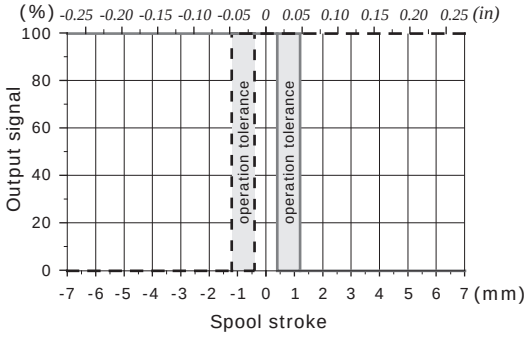


The SPSD position sensor converts the spool movements into an electric digital signal.
Main features are:
- contactless technology guarantees a long mechanichal life;
- available for the complete range of valves.

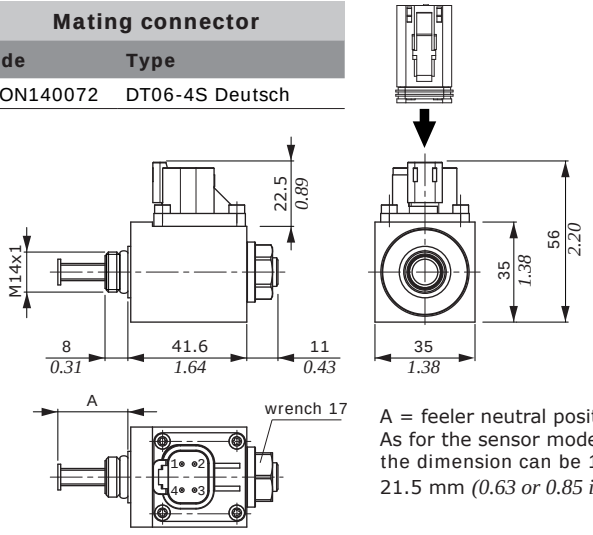
Typical applications:
- cranes
- telehandlers
- aerial platforms
- front-end loaders (mid-mount)

Working conditions		
Voltage supply		from 9 to 32 VDC
Current absorption		< 10 mA (no load)
Mechanical life		3x10⁶
Connector type		DT04-4P Deutsch
Weather protection		IP67 / IP69K
Working temperature		from -40°C to 105°C *(from -40°F to 221°F)*
Working pressure		350 bar *(5100 psi)*
Max. electrical stroke		±10 mm *(±0.39 in)*
Max. mechanical stroke		±10 mm *(±0.39 in)*
Output signal	type	PNP
	max. current	6 mA
EMC compatibility		ISO 13766 / ISO 14982
Mechanical vibrations, shock, bumps		IEC 68-2-6,-27,-29

Output signal (example) vs. spool stroke



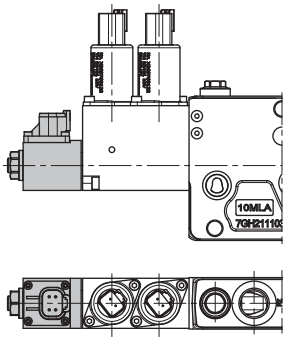
Mating connector	
Code	**Type**
5CON140072	DT06-4S Deutsch



A = feeler neutral position. As for the sensor model, the dimension can be 16 or 21.5 mm *(0.63 or 0.85 in)*

Connector PIN-OUT	
Pin	**Functions**
1	Out A
2	GND
3	VB+
4	Out B

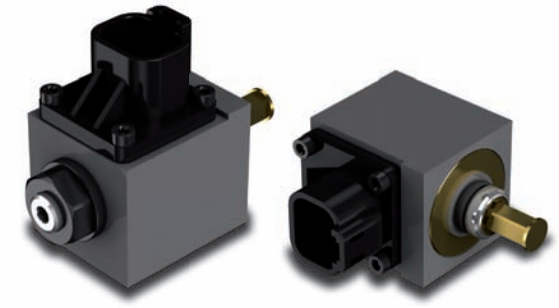
Example of sensor in 8EZ control with DPX100 working section



IMPORTANT: The sensor can be ordered exclusively through the controls assembled on the monoblock and sectional valves.
These controls, in different configurations, are available on the full range of Walvoil directional valves.

Spool position sensors

SPSL type

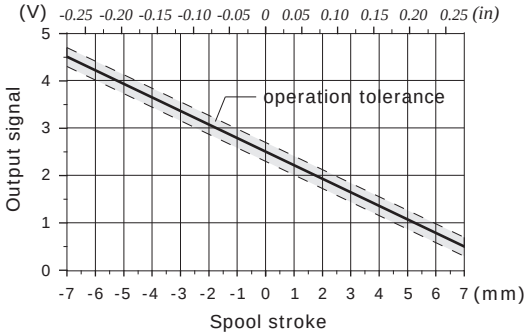


The SPSL position sensor converts the spool movements into a voltage linear signal.
Main features are:
- contactless technology guarantees a long mechanichal life;
- available for the complete range of valves.

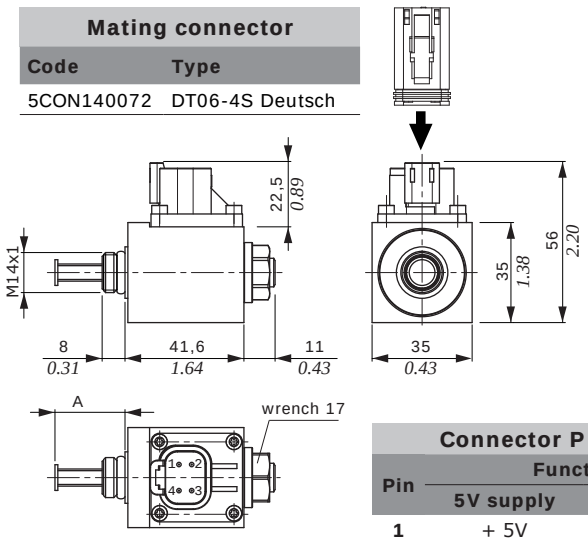
Typical applications:
- cranes
- telehandlers
- aerial platforms
- front-end loaders (mid-mount)

Working conditions		
Voltage supply		from 9 to 32 VDC or 5 VDC
Current absorption		< 10 mA (no load)
Mechanical life		3x10⁶
Connector type		DT04-4P Deutsch
Weather protection		IP67 / IP69K
Working temperature		from -40°C to 105°C *(from -40°F to 221°F)*
Working pressure		350 bar *(5100 psi)*
Max. electrical stroke		±10 mm *(±0.39 in)*
Max. mechanical stroke		±10 mm *(±0.39 in)*
Output signal	range	from 0.5 to 4.5 V
	linearity	± 5%
	spool in neutral	2.5 ± 0.2 V
	max. current	1 mA
EMC compatibility		ISO 13766 / ISO 14982
Mechanical vibrations, shock, bumps		IEC 68-2-6,-27,-29

Output signal (example) vs. spool stroke



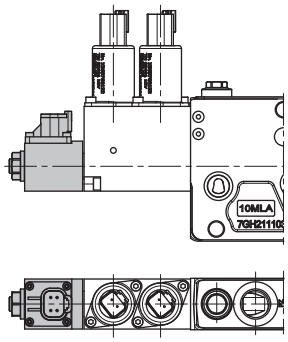
Mating connector	
Code	**Type**
5CON140072	DT06-4S Deutsch



A = feeler neutral position.
As for the sensor model, the dimension can be 16 or 21.5 mm *(0.63 or 0.85 in)*

Connector PIN-OUT		
Pin	**Functions**	
	5V supply	**8-32V supply**
1	+ 5V	signal OUT
2	not connected	GND
3	GND	VB+
4	signal OUT	not connected

Example of sensor in 8EZ control with DPX100 working section

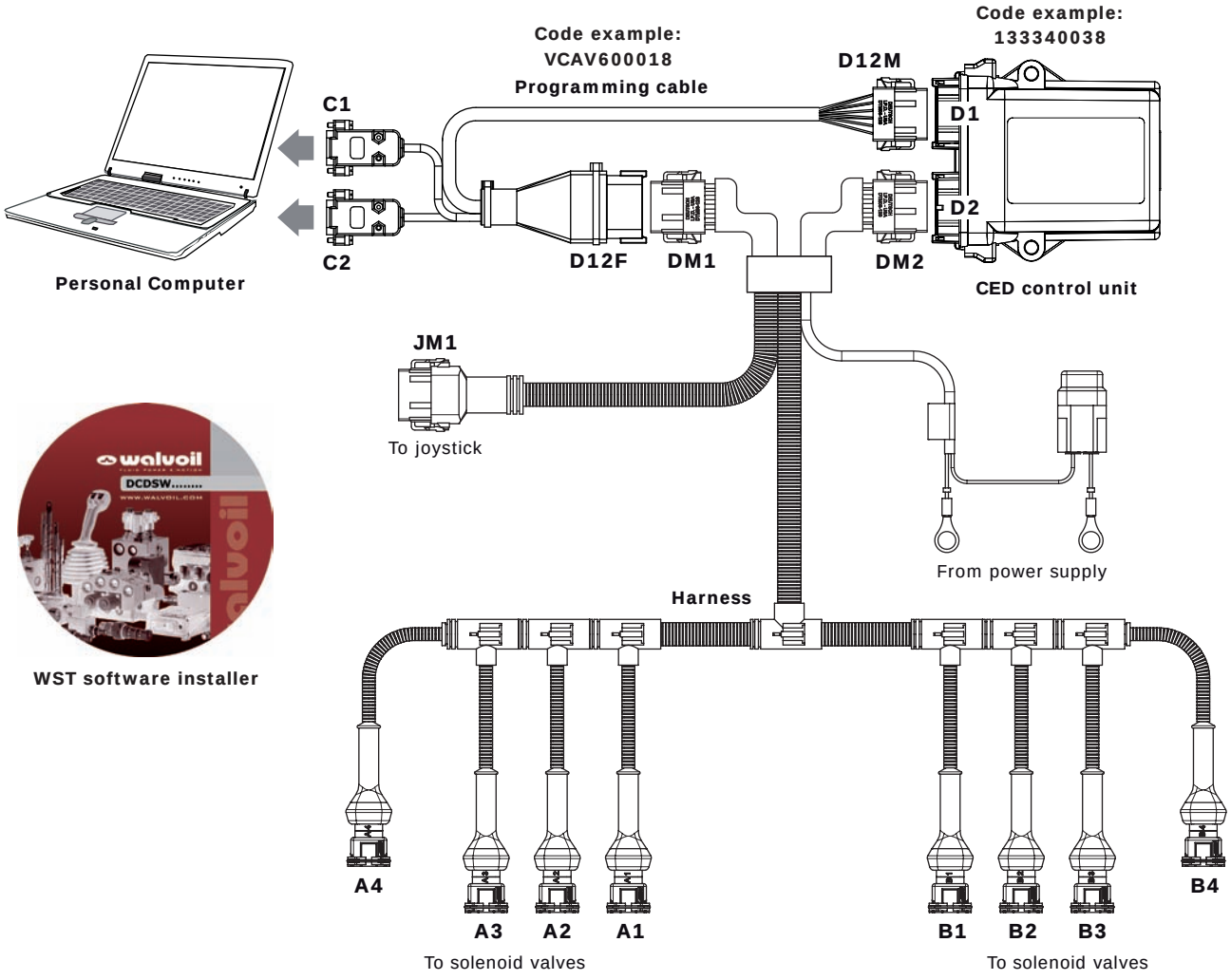


IMPORTANT: The sensor can be ordered exclusively through the controls assembled on the monoblock and sectional valves.
These controls, in different configurations, are available on the full range of Walvoil directional valves.

Control unit programming software

Walvoil Service Tools

CED series electronic control units are programmed in the Company with default operating parameters, suitable for most applications.
For special applications, the WST (Walvoil Service Tool) software can be used together with a personal computer to optimize the control parameters for the electrohydraulic modules. For example, minimum and maximum output current values can be set for linear curves.
You can download the WST installer software through Walvoil website with prior authorization, or you can request it on a CD. Its code is **DCDSW0170051**. Please, contact our Sales Department.



WST software installer

PHC electronic systems

- Complete electronic control systems, plug-and-play
- Pre-setted functionality
- Customization on request
- Applicable on a wide range of directional valves
- Robust construction
- Suitable for general applications

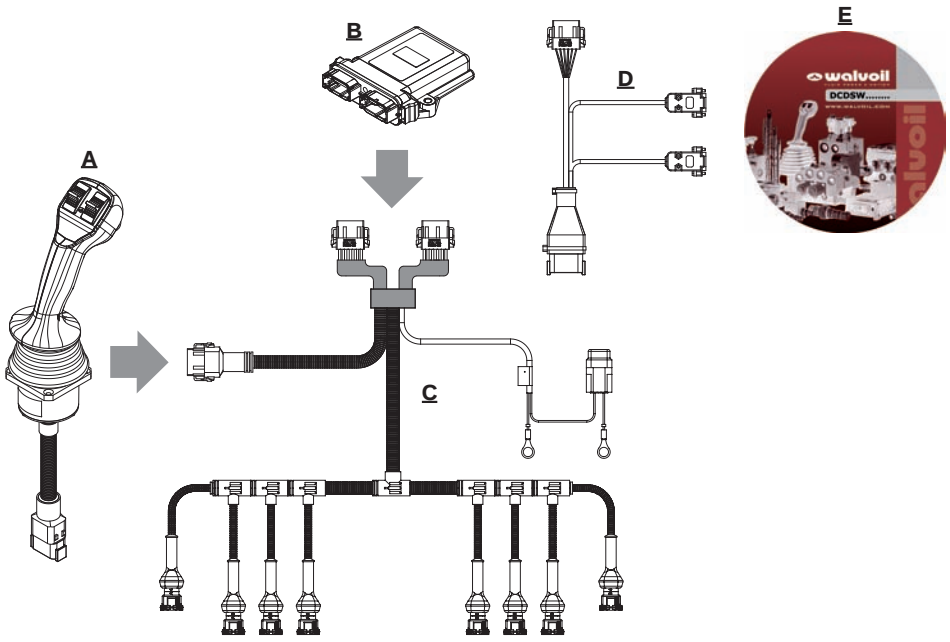
Working conditions								
General features		**PHC400F**	**PHC210C**	**PHC250C**	**PHC251C**	**PHC400C**	**PHC640C**	**PHC400P**
System type	potentiometric ratiometric	•						•
	CAN bus		•	•	•	•	•	
Proportional functions (nr.)		4	2	2	2	4	6	4
Float function management		•	•	•	•	•	•	•
Digital outputs (nr)		/	1	3	3	/	2	/
“Dead man” switch management		•	/	/	/	•	•	/

PHC400F

System description

The system can be used for 12VDC or 24VDC applications.
It allows to drive up to four functions/sections on the directional valve, all the controls are proportional.
The control signals come from an analog AJW joystick. CED400X control unit drives the directional valve.
The "dead man" switch enables all the functions; the float and the fast/slow signals are used to control the float and fast/slow functions.
Acceleration and decelerations ramp times are programmable and applicable to the machine movements for those applications that require to manage heavy loads.
Through a dedicated WST software, a few customizations can be set to adjust the system dynamic.

Code	**1XSE40002**
Description	PHC400F electronic system
Notes	12-24V application, 4 proportional functions (1 floating)



PHC400F parts

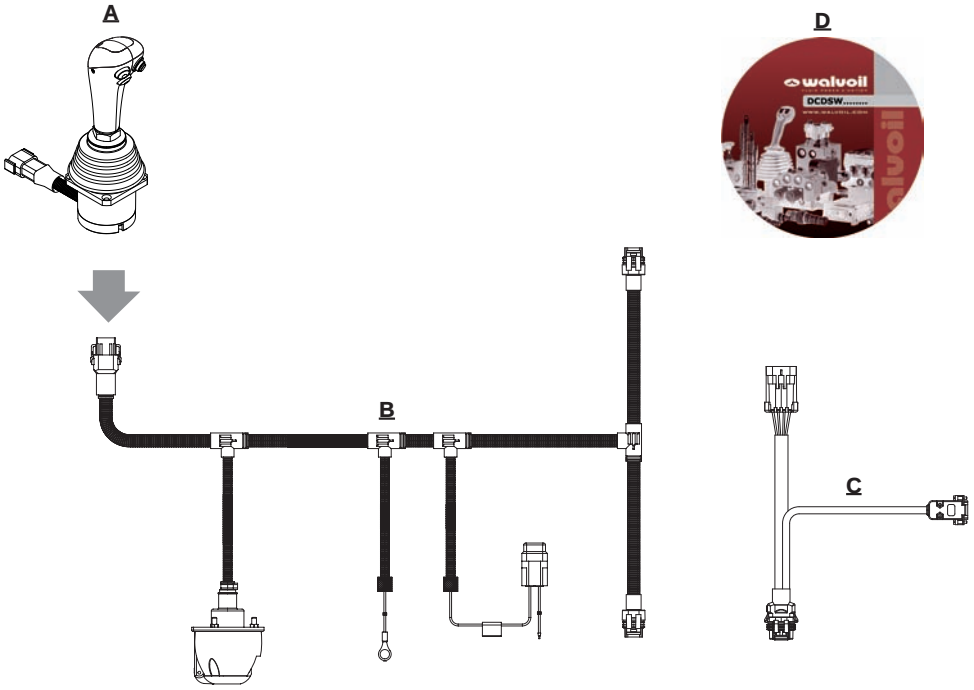
ID	Code	Type	Qty
A	**183540028**	AJW analog joystick: 4 proportional axis, "dead man" switch, 1 push-button	1
B	**183334003**	CED400X/PHC400F/v43.02 electronic control unit	1
C	**183480118**	KCD04 harness	1
D	**VCAV600018**	CED400X programming cable	1
E	**DCDSW0170051**	PHC/v2.0 SYSTEM WST software	1

PHC210C

System description

The system can be used for 12VDC applications.
It allows to drive up to two functions/sections on the directional valve, all the controls are proportional.
The control signals come from a CAN bus CJW joystick, that drives two mechatronic MCS controls, which drive the directional valve.
The float signal is used to control the float function on the directional valve, one external diverter valve can be driven with one push-buttons from the joystick handle.
Through a dedicated WST software, the diagnostic on the system can be executed.

Code	**1XSE21002**
Description	PHC210C electronic system
Notes	12V application, 2 proportional functions (1 for floating), 3rd function through diverter valves



PHC210C parts

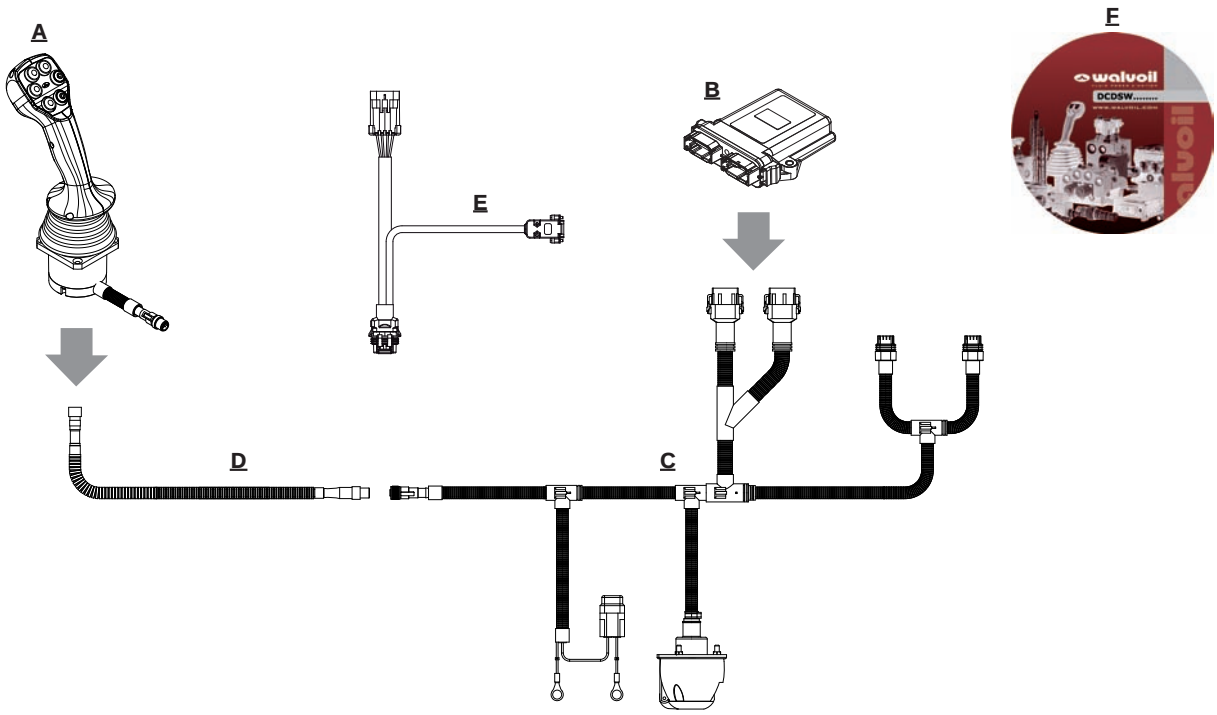
ID	Code	Type	Qty
A	**183530010**	AJW analog joystick: 2 proportional axis, 3 push-buttons.	1
B	**183480165**	KCD05 harness	1
C	**VCAV600020**	MCS programming cable	1
D	**DCDSW0210004**	FL-MCS/v2.00 WST software	1

PHC250C

System description

The system can be used for the front-end loader application, 12VDC.
It allows to drive up to two functions/sections on the directional valve, all the controls are proportional.
The control signals come from a CJW CAN bus joystick, that drives two mechatronic MCS controls, which drive the directional valve.
The float and Fast/Slow functions are available on the directional valve, three external diverter valves can be driven with the push-buttons from the joystick handle.
Through a dedicated WST software, the diagnostic on the system can be executed.

Code	**1XSE21006**
Description	PHC250C electronic system
Notes	12V application, 2 proportional functions (1 floating), 3rd, 4th and 5th function for diverter valves



PHC250C parts

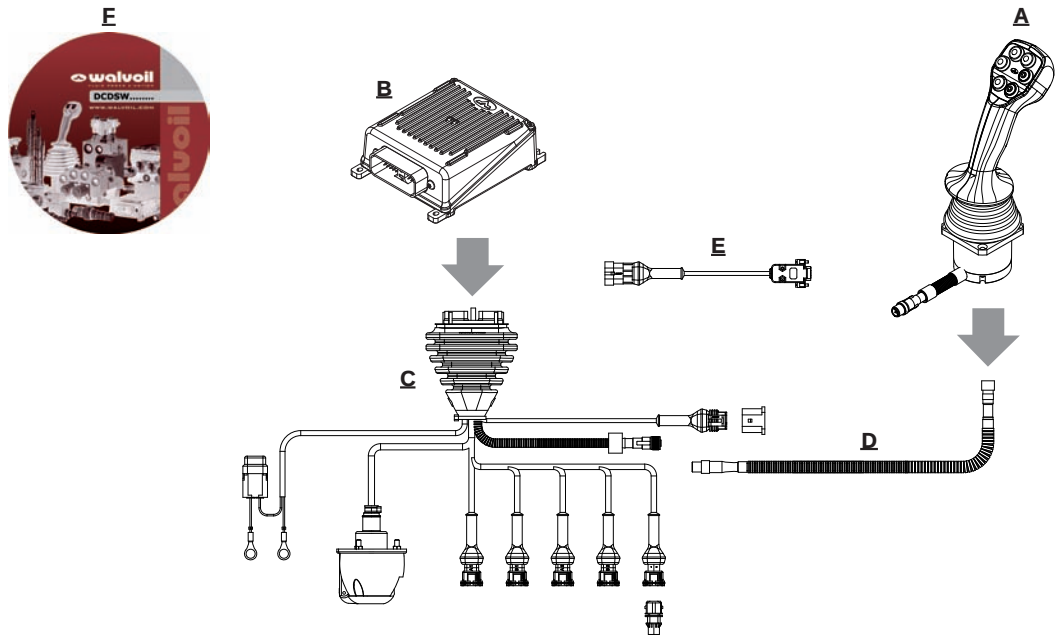
ID	Code	Type	Qty
A	**183530017**	CJW CAN bus joystick: 2 proportional axis, 1 on/off switch, 5 push-buttons	1
B	**183360010**	CED040/PHC250C-12V/v06.00 electronic control unit	1
C	**183480166**	KCD05 harness programming cable	1
D	**183490001**	extension for joystick connection , L=4m (*157.48 in*)	1
E	**VCAV600020**	MCS programming cable	1
F	**DCDSW0210004**	WST/FLC-MCS/v2.00 software	1

PHC251C

System description

The system can be used for the front-end loader application, 12VDC.
It allows to drive up to two functions/sections on the directional valve, all the controls are proportional.
The control signals come from a CJW CAN bus joystick. CED252 control unit drives the directional valve.
The float and fast/Slow functions are available on the directional valve, three external diverter valves can be driven with the push-buttons from the joystick handle.
Through a dedicated WST software, the diagnostic on the system can be executed.

Code	**1XSE21007**
Description	PHC251C electronic system
Notes	12V application, 2 proportional functions (1 floating), 3rd, 4th and 5th function for diverter valves



PHC251C parts

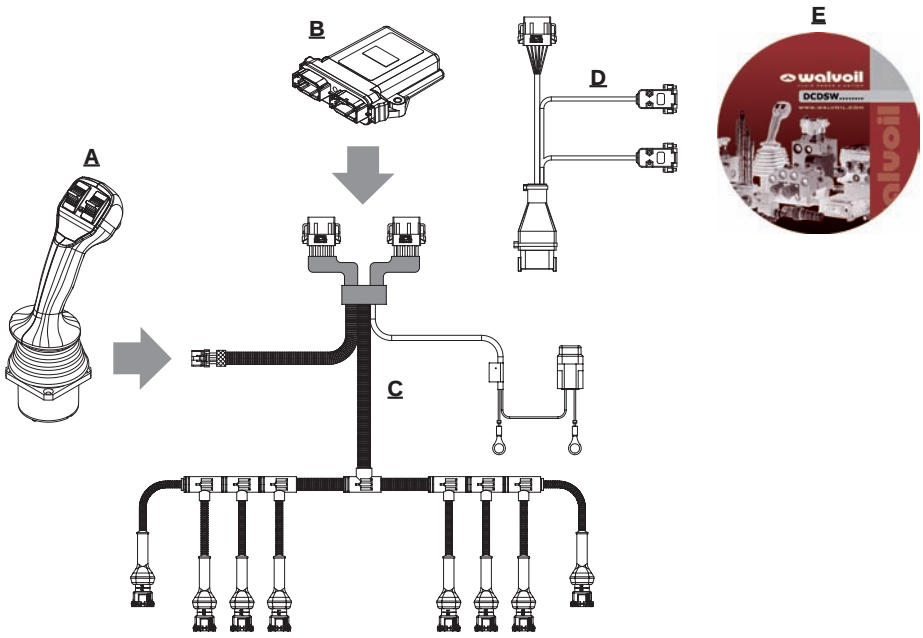
ID	Code	Type	Qty
A	**183530017**	CJW CAN bus joystick: 2 proportional axis, 1 on/off switch, 5 push-buttons	1
B	**183350025**	CED252/PHC251C/v40.25 electronic control unit	1
C	**183480167**	KCD09 harness	1
D	**183490001**	extension for joystick connection , L=4m (*157.48 in*)	1
E	**VCAV600014**	CED252 programming cable	1
F	**DCDSW004005**	WST/FLC/v11.01 software	1

PHC400C

System description

The system can be used for 12VDC or 24VDC applications.
It allows to drive up to four functions/sections on the directional valve, all the controls are proportional.
The control signals come from a CAN bus CJW joystick. CED400X control unit drives the directional valve.
The "dead man" switch enables all the functions; the float and the fast/slow signals are used to control the float and fast/slow functions.
Acceleration and decelerations ramp times are programmable and applicable to the machine movements for those applications that require to manage heavy loads.
Through a dedicated WST software, a few customizations can be set to adjust the system dynamic.

Code	**1XSE40003**
Description	PHC400C electronic system
Notes	12-24V application, 4 proportional functions (1 floating)



PHC400C parts

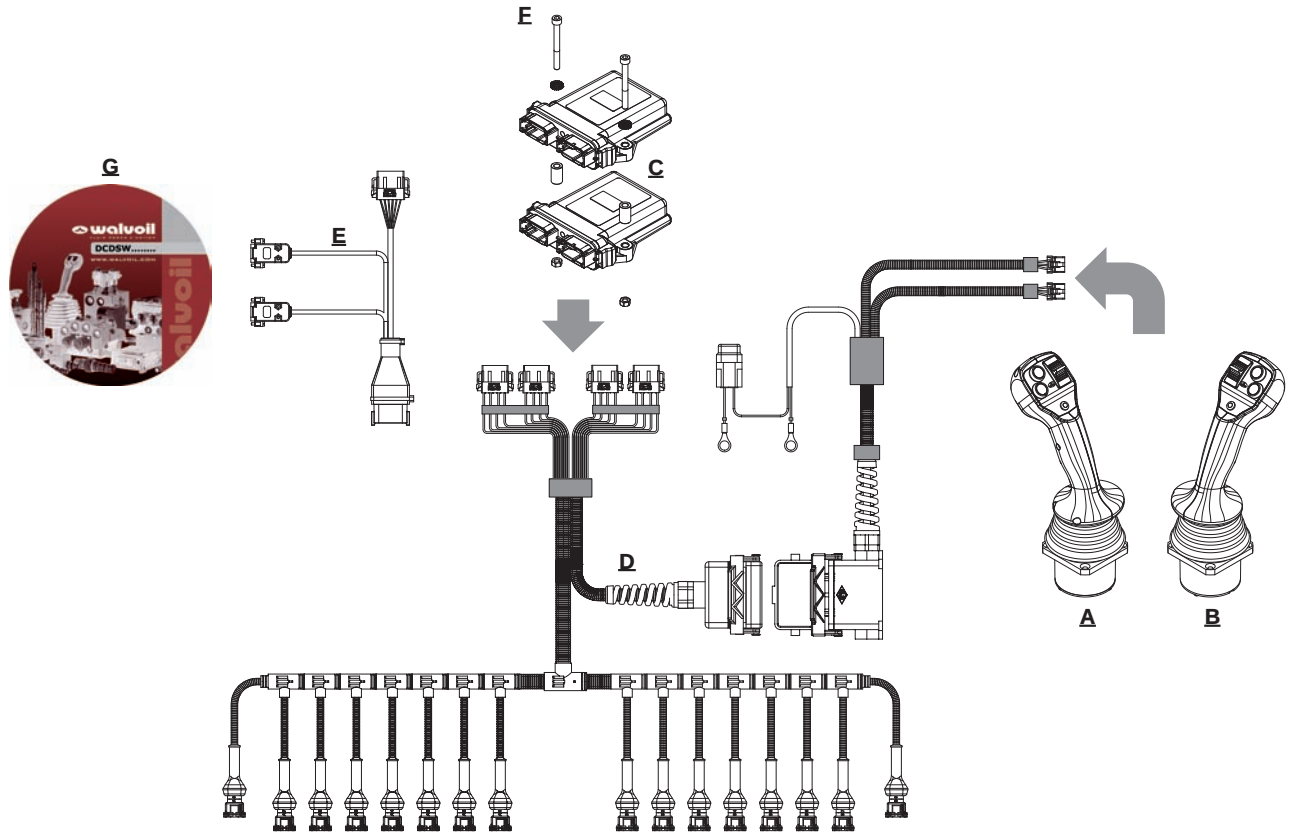
ID	Code	Type	Qty
A	**183530011**	CJW CAN bus joystick: 4 proportional axis, "dead man" switch, 1 push-button	1
B	**183338007**	CED400X/PHC400C/v73.01 electronic control unit	1
C	**183480118**	KCD04 harness	1
D	**VCAV600018**	CED400X programming cable	1
E	**DCDSW0170051**	PHC/v2.0 SYSTEM WST software	1

PHC640C

System description

The system can be used for 12VDC or 24VDC applications.
It allows to drive up to eight functions/sections on the directional valve; six controls are proportional, two controls are on/off actuated.
The control signals come from a CAN bus CJW joystick. CED400X control units drive the directional valve.
The "dead man" switch enables all the functions.
Acceleration and decelerations ramp times are programmable and applicable to the machine movements for those applications that require to manage heavy loads.
Through a dedicated WST software, a few customizations can be set to adjust the system dynamic.

Code	**1XSE40004**
Description	PHC640C electronic system
Notes	12-24V application, 6 proportional functions, 2 on/off functions



PHC640C parts

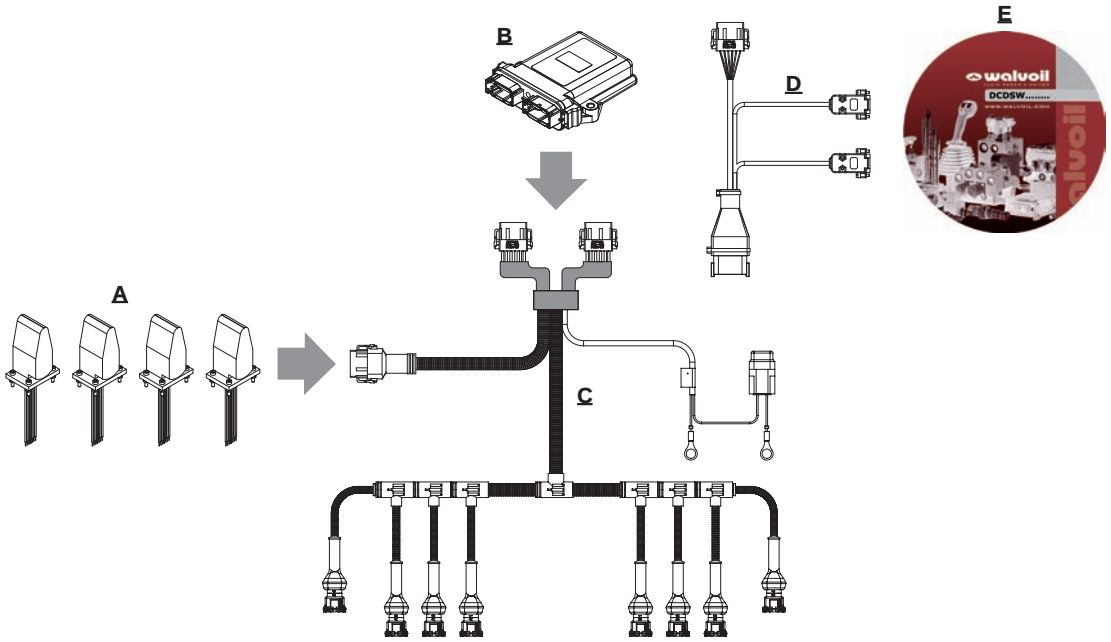
ID	Code	Type	Qty
A	**183530012**	CJW CAN bus joystick: 3 proportional functions, "dead man" switch, 2 push-buttons, 1 LED, left configuration	1
B	**183530013**	CJW CAN bus joystick: 3 proportional functions, "dead man" switch, 2 push-buttons, 1 LED, right configuration	1
C	**183338007**	CED400X/PHC400C/v73.01 electronic control unit	2
D	**183480169**	KCD03 harness	1
E	**VCAV600018**	CED400X programming cable	1
F	**5KIT950000**	CED400X assembling kit	1
G	**DCDSW0170051**	PHC/v2.0 SYSTEM WST software	1

PHC400P

System description

The system can be used for 12VDC or 24VDC applications.
It allows to drive up to four functions/sections on the directional valve, all the controls are proportional.
The control signals come from four single axis analog joysticks. CED400X control unit drives the directional valve.
The 'operator presence' switch enables all the functions, the float and the fast/slow commands are used to control the float and fast/slow functions.
Acceleration and decelerations ramp times are programmable and applicable to the machine movements for those applications that require to manage heavy loads.
Through a dedicated WST software, a few customizations can be set to adjust the system dynamic.

Code	**1XSE40005**
Description	PHC400P electronic system
Notes	12-24V application, 4 proportional functions (1 floating)



PHC400P parts

ID	Code	Type	Qty
A	**VJOY200001**	MDN142 potentiometric joystick: 1 proportional axis with redundancy	4
B	**183334003**	CED400X/PHC400F/v43.02 electronic control unit	1
C	**183480118**	KCD04 harness	1
D	**VCAV600018**	CED400X programming cable	1
E	**DCDSW0170051**	PHC/v2.0 SYSTEM WST software	1

Notes

Notes

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