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
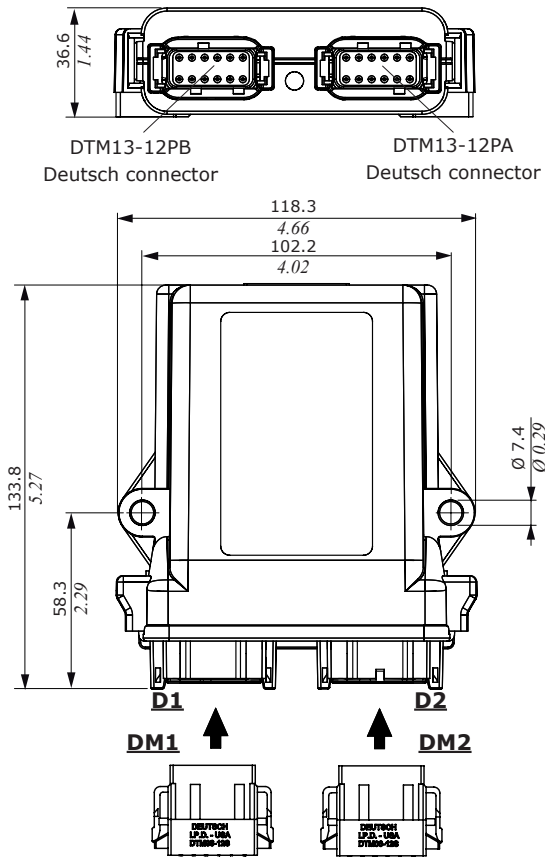- Designed for PHC electronic systems

| 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

Electronic control units
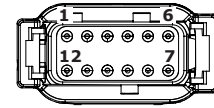
CED100X - CED400X electronic control units

Dimensions and pin-out

DTM13-12PB
Deutsch connector

DTM13-12PA
Deutsch connector

D1 connector

D2 connector

D1
D2

DM1
DM2
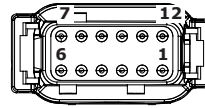
	Connector PIN-OUT					
Pin	**D1 connector**			**D2 connector**		
	function	**CED100X**	**CED400X**	**function**	**CED100X**	**CED400X**
1	VK+	●	●	OUT_8	-	●
2	AI_4	●	●	OUT_2	●	●
3	AI_3	●	●	OUT_4	-	●
4	DI_1	●	●	OUT_3	-	●
5	RX	●	●	OUT_6	-	●
6	CAN_L	●	●	OUT_5	-	●
7	CAN_H	●	●	GND_3	-	●
8	TX	●	●	GND_2	-	●
9	DI_2	●	●	GND_1	●	●
10	AI_1	●	●	GND_4	-	●
11	AI_2	●	●	OUT_1	●	●
12	VB-	●	●	OUT_7	-	●

Mating connectors	
Name	**Type**
DM1	DTM06-12SA Deutsch
DM2	DTM06-12SB Deutsch

● available
- not available

CED100X control unit code	
Code	**183331001 (*)**
Description	CED100X/PHC100F/v43.03
Notes	Supply voltage 8-32V 1 prop. functions (2 outputs - 2A)

NOTE (*): Optimized software for 12V operation

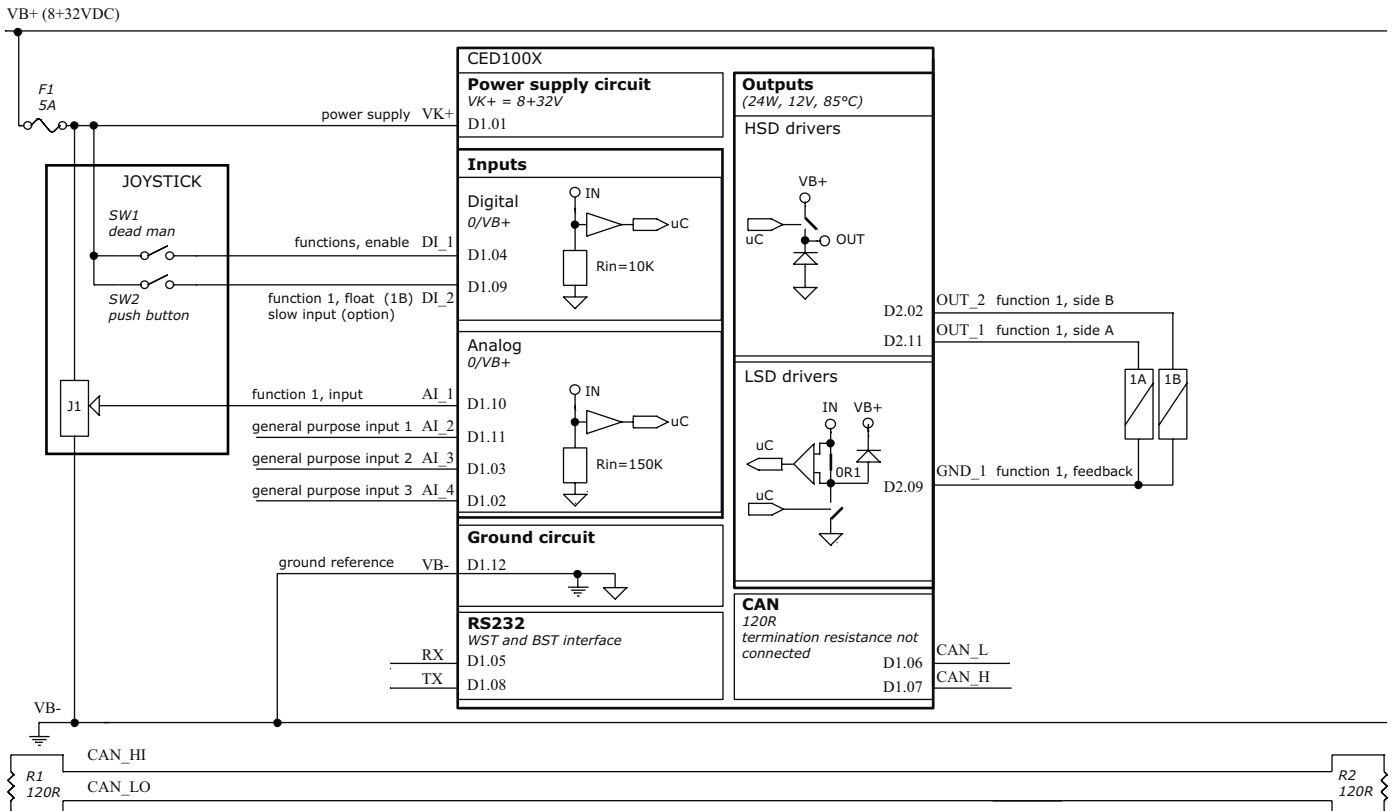| CED400X control unit codes	
Code	**183334003 (*)**
Description	CED400X/PHC400F/v43.03
Notes	Supply voltage 8-32V 4 prop. functions (8 outputs - 2A)
Code	**183338007**
Description	CED400X/PHC400C/v73.01
Notes	Supply voltage 8-32V, CANopen interface, 4 proportional functions (8 outputs - 2A)

NOTE (*): Optimized software for 12V operation

CED100X system diagram

VB+ (8÷32VDC)

CED100X

Power supply circuit
VK+ = 8÷32V
D1.01 — power supply VK+

F1
5A

JOYSTICK

SW1
dead man

SW2
push button

J1

Inputs

Digital
0/VB+
D1.04
D1.09 — functions, enable DI_1 / function 1, float (1B) slow input (option) DI_2

IN → uC
Rin=10K

Analog
0/VB+
D1.10 — function 1, input AI_1
D1.11 — general purpose input 1 AI_2
D1.03 — general purpose input 2 AI_3
D1.02 — general purpose input 3 AI_4

IN → uC
Rin=150K

Ground circuit
D1.12 — ground reference VB-

RS232
WST and BST interface
D1.05 — RX
D1.08 — TX

Outputs
(24W, 12V, 85°C)

HSD drivers
VB+
uC — OUT
D2.02
D2.11 — OUT_2 function 1, side B / OUT_1 function 1, side A

LSD drivers
IN VB+
uC
uC
0R1
D2.09 — GND_1 function 1, feedback

1A 1B

CAN
120R
termination resistance not connected
D1.06 — CAN_L
D1.07 — CAN_H

VB-

R1
120R

CAN_HI
CAN_LO

R2
120R

CED100X - CED400X electronic control units

CED400X system diagram

VB+ (8÷32VDC)

F1
7.5A

CED400X

Power supply circuit
VK+ = 8÷32V
D1.01

power supply VK+

Inputs

1+8 JOYSTICK

SW1
dead man

9   functions, enable DI_1

7

SW2
push button

function 1, float (1B) DI_2
slow input (option)

Digital
0/VB+
D1.04
D1.09

IN

uC

Rin=10K

Analog
0/VB+
D1.10
D1.11
D1.03
D1.02

IN

uC

Rin=150K

J1

J2

J3

J4

3   function 1, input AI_1
4   function 2, input AI_2
5   function 3, input AI_3
6   function 4, input AI_4

2

Ground circuit
D1.12

ground reference VB-

RS232
WST and BST interface
D1.05
D1.08

RX
TX

Outputs
(24W, 12V, 85°C)

HSD drivers

D2.01
D2.12
D2.05
D2.06
D2.03
D2.04
D2.02
D2.11

VB+

uC   OUT

LSD drivers

IN   VB+

uC

0R1

uC

D2.09
D2.08
D2.07
D2.10

CAN
120R
termination resistance not connected
D1.06
D1.07

OUT_8 function 4, side B
OUT_7 function 4, side A
OUT_6 function 3, side B
OUT_5 function 3, side A
OUT_4 function 2, side B
OUT_3 function 2, side A
OUT_2 function 1, side B
OUT_1 function 1, side A

1A 1B 2A 2B 3A 3B 4A 4B

GND_1 function 1, feedback
GND_2 function 2, feedback
GND_3 function 3, feedback
GND_4 function 4, feedback

CAN_L
CAN_H

VB-

CAN_HI

R1
120R

CAN_LO

R2
120R

CED040 electronic control unit

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

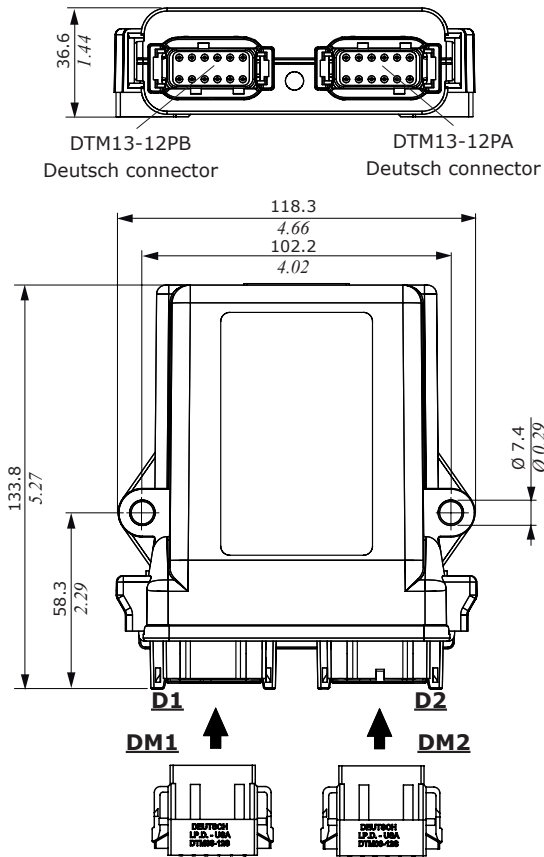| Working conditions	
General features	**CED040**
Supply voltage	from 9 to 16 V
Current consumption	50 mA (no-load current) 15A (max. supply)
Max current output	15 A (2 output)
Interface	CAN 2.0 A - B
EMC compatibility	150 V/m - ISO13766, ISO14982
Environmental compatibility	IEC60068-2-6/27/29
Working 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

D1

D2

DM1

DM2
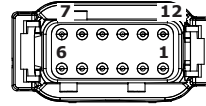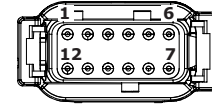
Connectors PIN-OUT		
Pin	**Function**	
	D1 connector	**D2 connector**
1	OUT_1	OUT_L
2	VB-	DI_5
3	CAN_H	DI_1
4	CAN_L	VJ-
5	AI_4	AI_3
6	AI_5	AI_2
7	VK+	AI_1
8	VK+	VJ+
9	OUT_2	DI_2
10	OUT_3	DI_3
11	OUT_4	DI_4
12	OUT_1	DI_6

Mating connectors	
Name	**Type**
DM1	DTM06-12SA Deutsch
DM2	DTM06-12SB Deutsch

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

System diagram
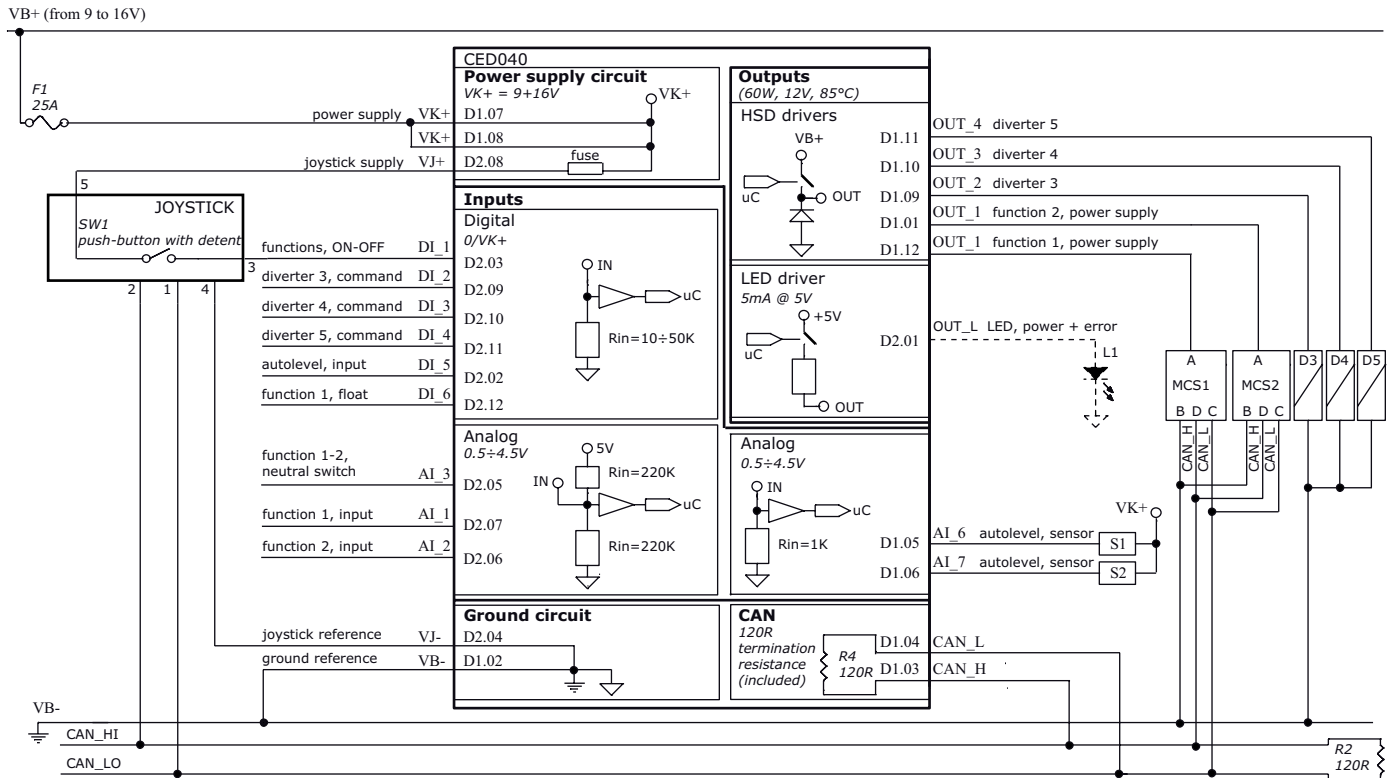
CED040/PHC040P configuration
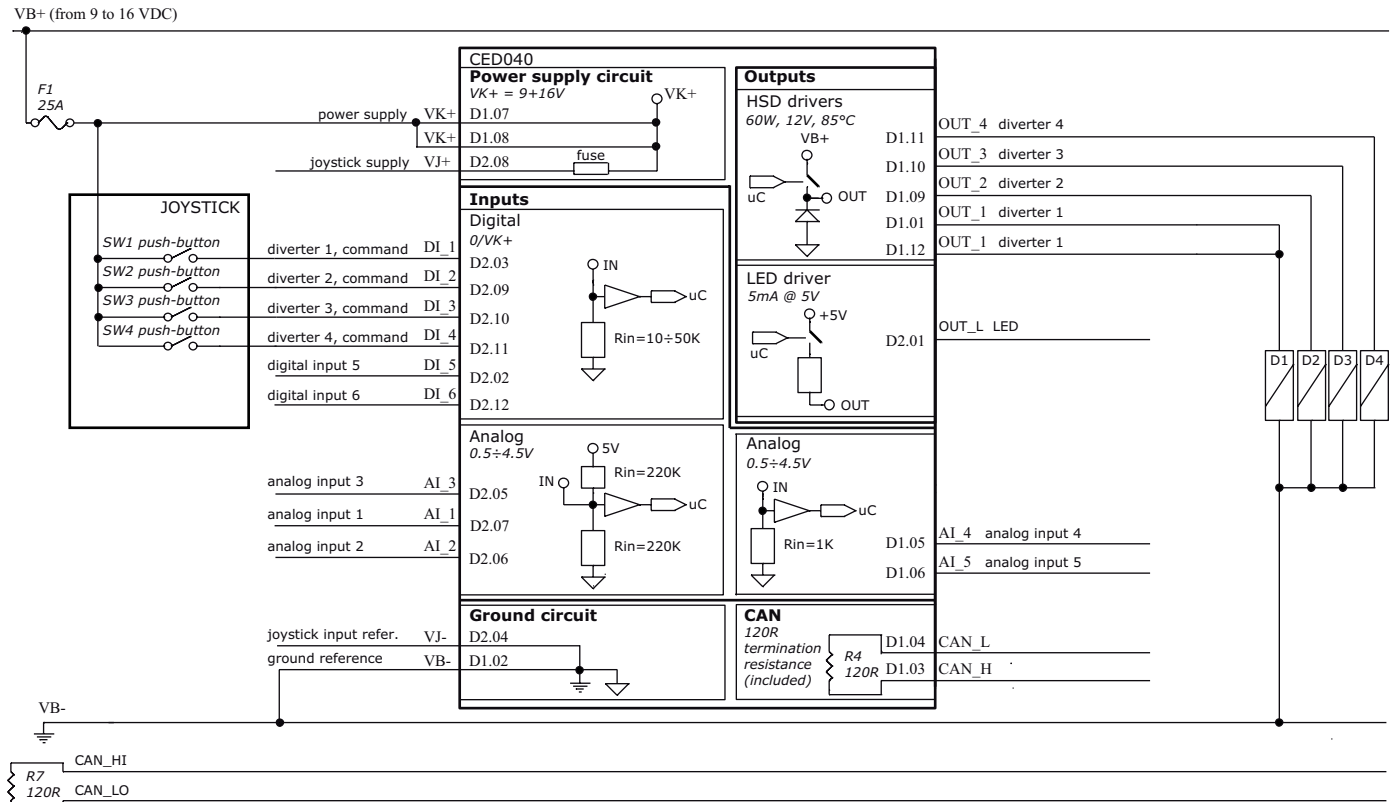
CED040 electronic control unit

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

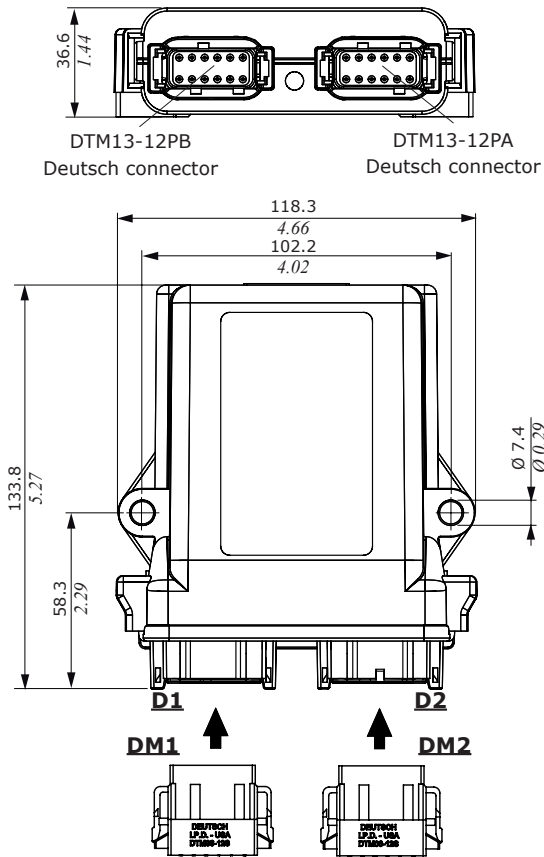| Working conditions	
General features	**CED160**
Supply voltage	from 9 to 16 V
Current consumption	50 mA (no-load current) 15A (max. supply)
Max. current output	7.5 A
Interface	CAN 2.0 A - B, 125-250 Kbit/sec
EMC compatibility	150 V/m - ISO13766, ISO14982
Environmental compatibility	IEC60068-2-6/27/29
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

7 — 12
6 — 1

D2 connector

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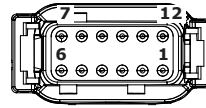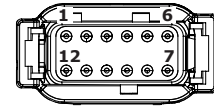
Connector PIN-OUT		
Pin	**Function**	
	D1 connector	**D2 connector**
1	OUT_1	DI_5
2	VB-	DI_6
3	CAN_H	DI_1
4	CAN_L	GND_P
5	OUT_5	AI_3
6	OUT_6	AI_2
7	VK+	AI_1
8	VK+	OUT_B
9	OUT_2	DI_2
10	OUT_3	DI_3
11	OUT_4	DI_4
12	OUT_1	OUT_A

Mating connectors	
Name	**Type**
DM1	DTM06-12SA Deutsch
DM2	DTM06-12SB Deutsch

CED160 control unit code	
Code	**183360008**
Description	CED160/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

VB+ (from 9 to 16 VDC)

CED160

Power supply circuit
VK+ = 9÷16V

power supply	VK+	D1.07
	VK+	D1.08

VK+

CONSOLE

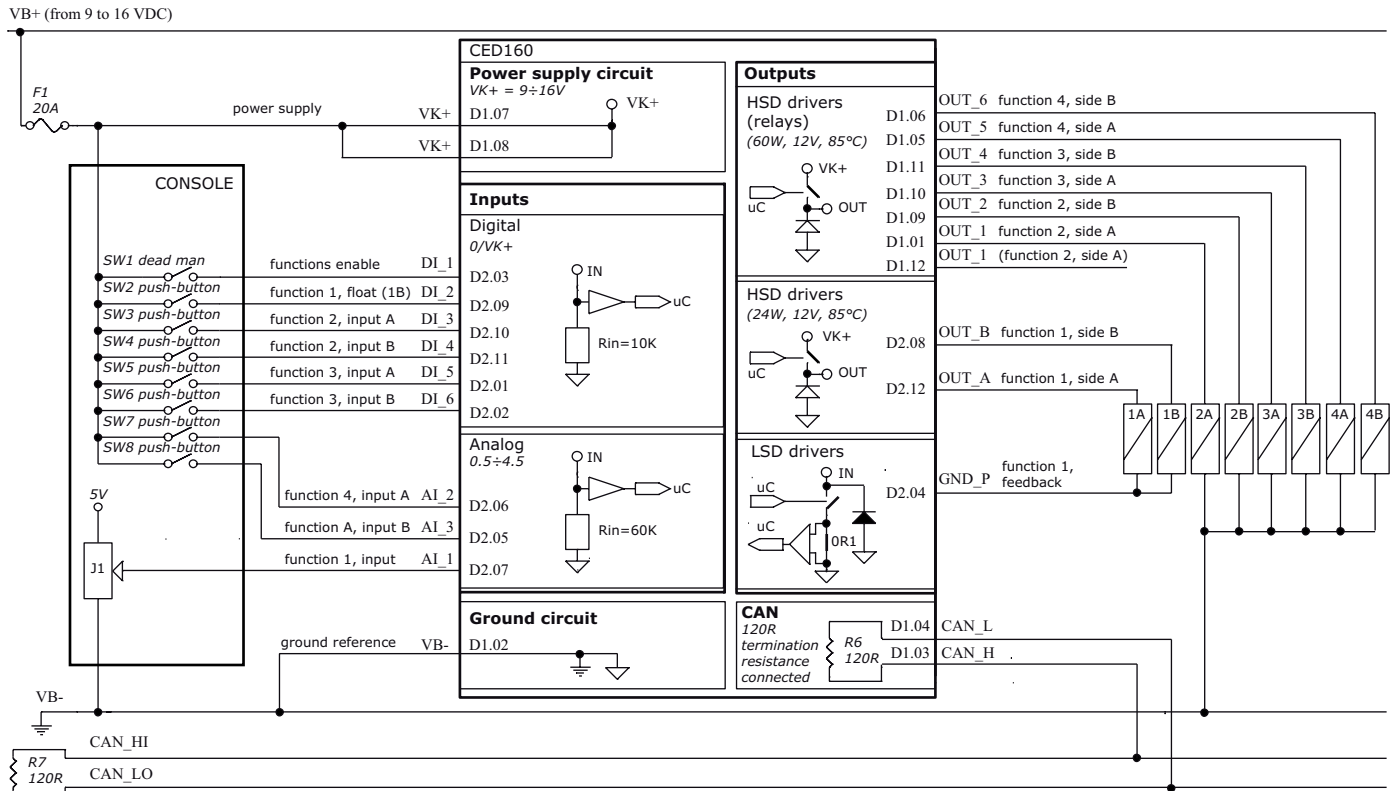|		
SW1 *dead man*	functions enable	DI_1
SW2 *push-button*	function 1, float (1B)	DI_2
SW3 *push-button*	function 2, input A	DI_3
SW4 *push-button*	function 2, input B	DI_4
SW5 *push-button*	function 3, input A	DI_5
SW6 *push-button*	function 3, input B	DI_6
SW7 *push-button*		
SW8 *push-button*		

Inputs

Digital
0/VK+

D2.03
D2.09
D2.10
D2.11
D2.01
D2.02

IN
uC
Rin=10K

5V

J1

function 4, input A	AI_2	
function A, input B	AI_3	
function 1, input	AI_1	

Analog
0.5÷4.5

D2.06
D2.05
D2.07

IN
uC
Rin=60K

Outputs

HSD drivers
(relays)
(60W, 12V, 85°C)

D1.06
D1.05
D1.11
D1.10
D1.09
D1.01
D1.12

VK+
uC OUT

HSD drivers
(24W, 12V, 85°C)

D2.08
D2.12

VK+
uC OUT

LSD drivers

IN
uC
uC
0R1
D2.04

OUT_6	function 4, side B
OUT_5	function 4, side A
OUT_4	function 3, side B
OUT_3	function 3, side A
OUT_2	function 2, side B
OUT_1	function 2, side A
OUT_1	(function 2, side A)
OUT_B	function 1, side B
OUT_A	function 1, side A

GND_P function 1, feedback

1A | 1B | 2A | 2B | 3A | 3B | 4A | 4B

Ground circuit

D1.02

ground reference VB-

CAN
120R termination resistance connected

R6 120R	D1.04	CAN_L
	D1.03	CAN_H

VB-

R7 120R CAN_HI

CAN_LO

CED160 electronic control unit

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.
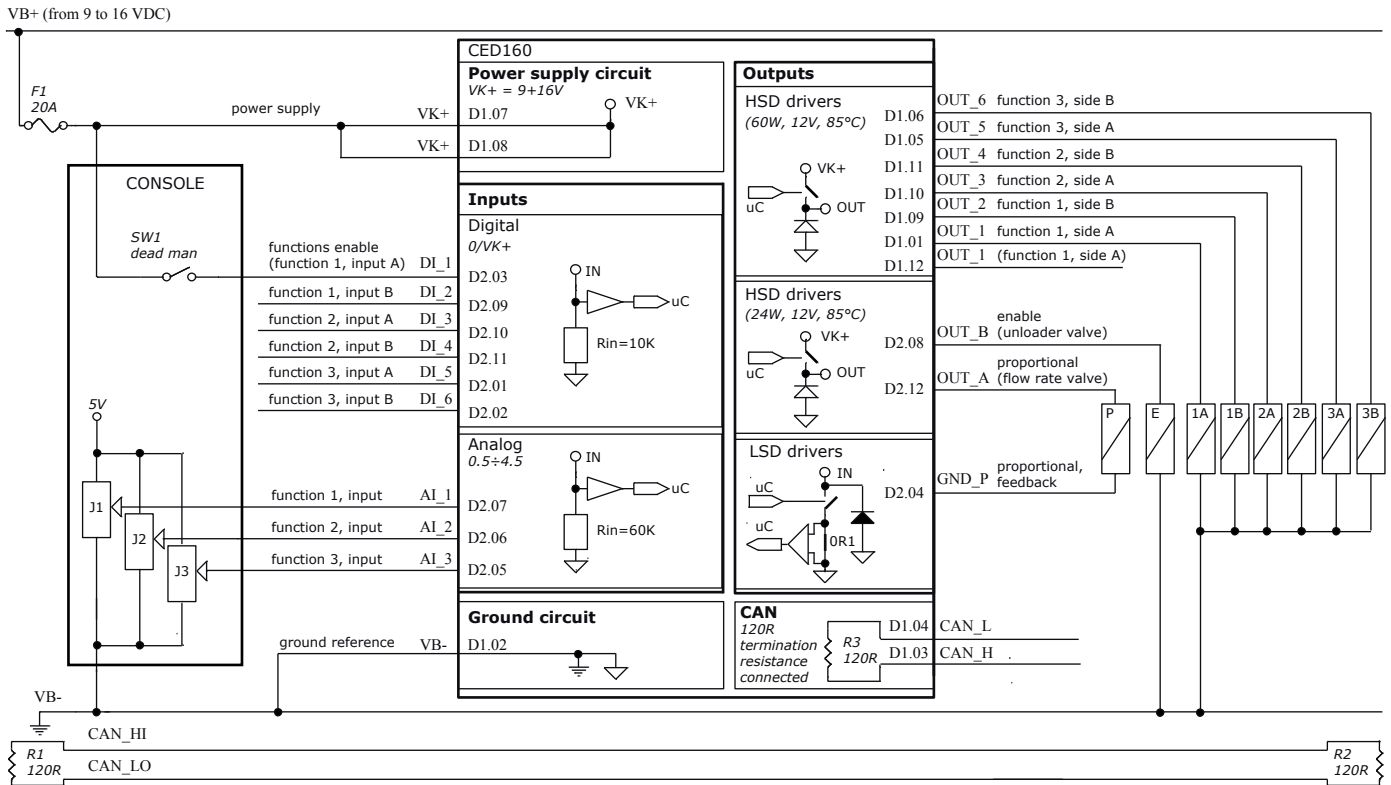
CED252 electronic control unit

- 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
- Available with ISOBUS (ISO-11783) standard certified protocol (AUX-N compliant)

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

DRC23-40PA
Deutsch connector

D1 connector

DM1
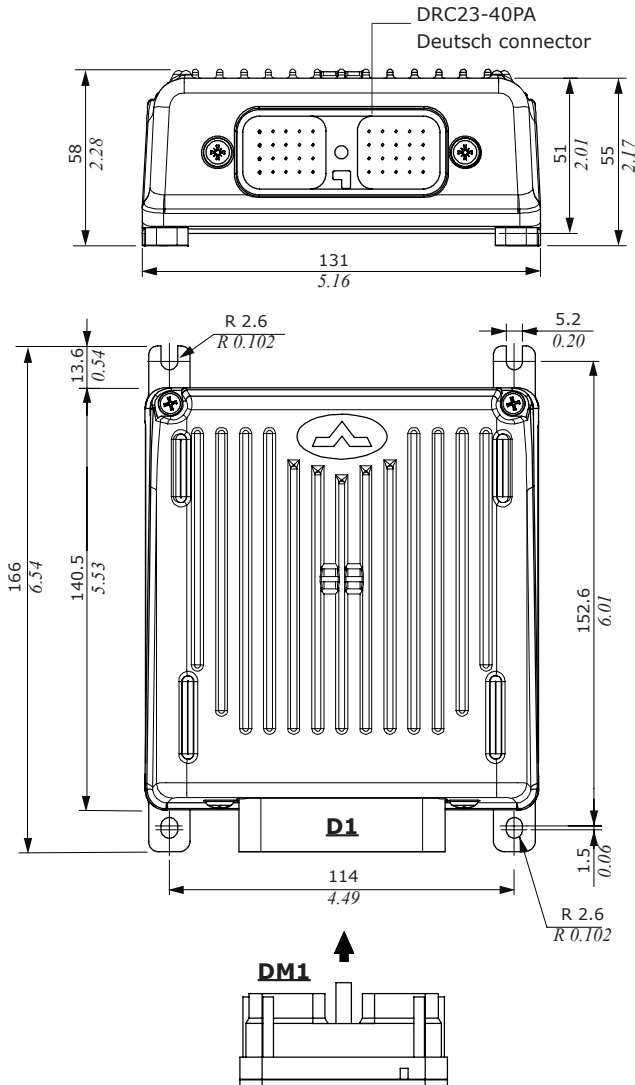
Mating connectors	
Name	**Type**
DM1	DRC26-40SA Deutsch
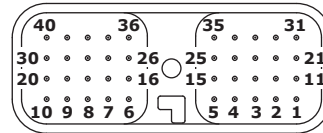
D connector PIN-OUT

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

CERTIFICATE

The Agricultural Industry Electronics Foundation (AEF)
certifies that the below mentioned product developed by

**Walvoil S.p.A.,
via Adige 13/D, 42124 Reggio Emilia, Italy,**

has been successfully tested and is in compliance with the ISO standard 11783
and with the AEF ISOBUS functionality guidelines.

ISOBUS

The AEF ISOBUS Conformance Test Version 2015/7 has been executed on October 30th, 2015 by

Reggio Emilia Innovazione
Via Sicilia 31
42122 Reggio Emilia
Italy

This Certificate is registered under Compliance Certification ID (CCID) 609/2015/7/523/5261.

ECU Manufacturer **Walvoil S.p.A.**
Hardware-ID 000131
Software-Version **40.33.02#**
RE.Lab ISOBUS Stack 03.01.00.00_02#

Functionalities

Peter van der Vlugt, Chairman,
October 30th, 2015

Agricultural Industry Electronics Foundation (AEF), Lyoner Straße 18, 60528 Frankfurt/Main, Germany.

AEF   ENAMA

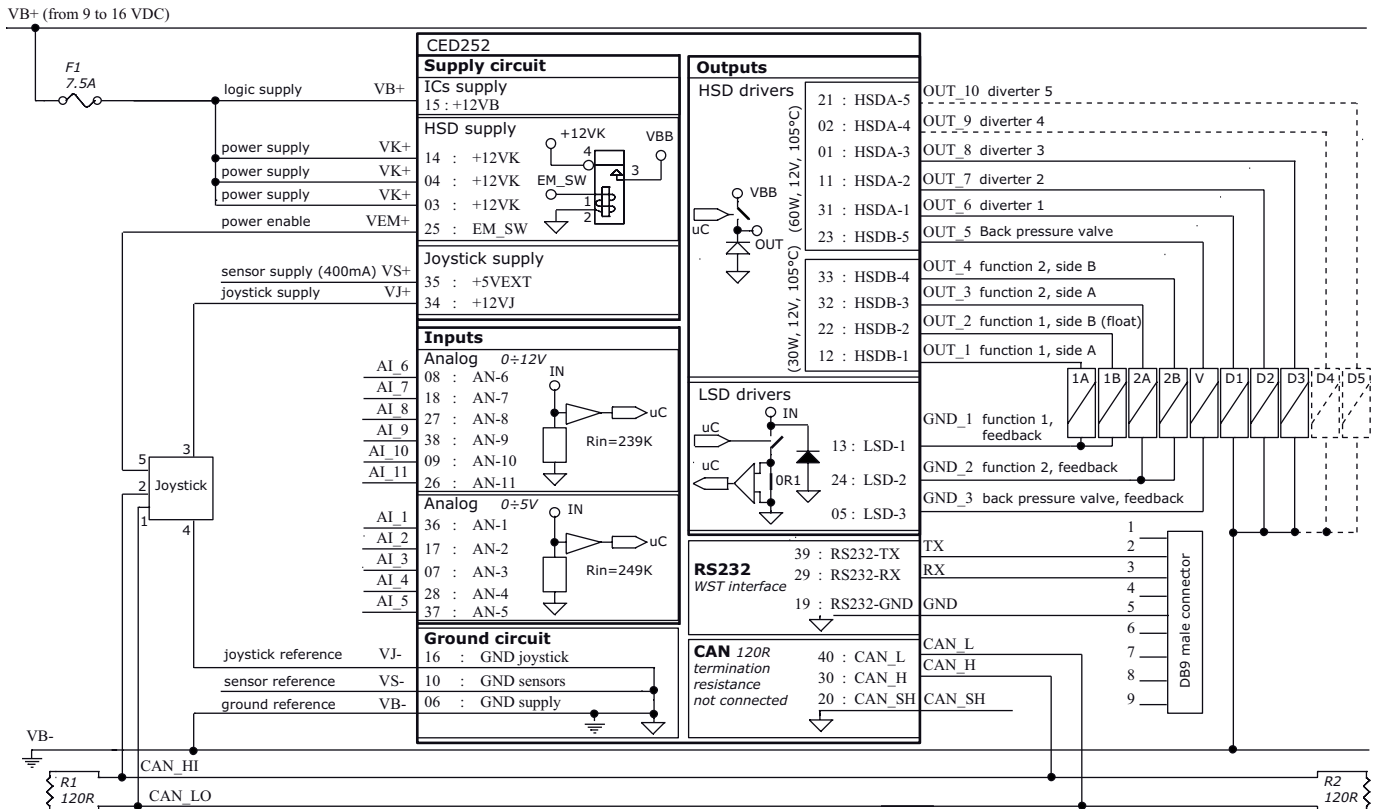| CED252 control unit code	
Code	**183350025**
Protocol	SAE J1939
Description	CED252/PHC251C/v4015
Notes	Supply voltage 12V, 2 prop. function (4 outputs - 2A), 3 ON-OFF outputs (5A)

CED252 control unit code, ISOBUS certification	
Code	**183350030**
Protocol	ISOBUS
Description	CED252/ISOBUS/LOADER/v4033.02
Notes	Supply voltage from 9 to 16V, 5 x HSD* proportional outputs (2A), 5 x HSD* ON-OFF outputs (5A)

NOTE (*): HSD - High Side Driver
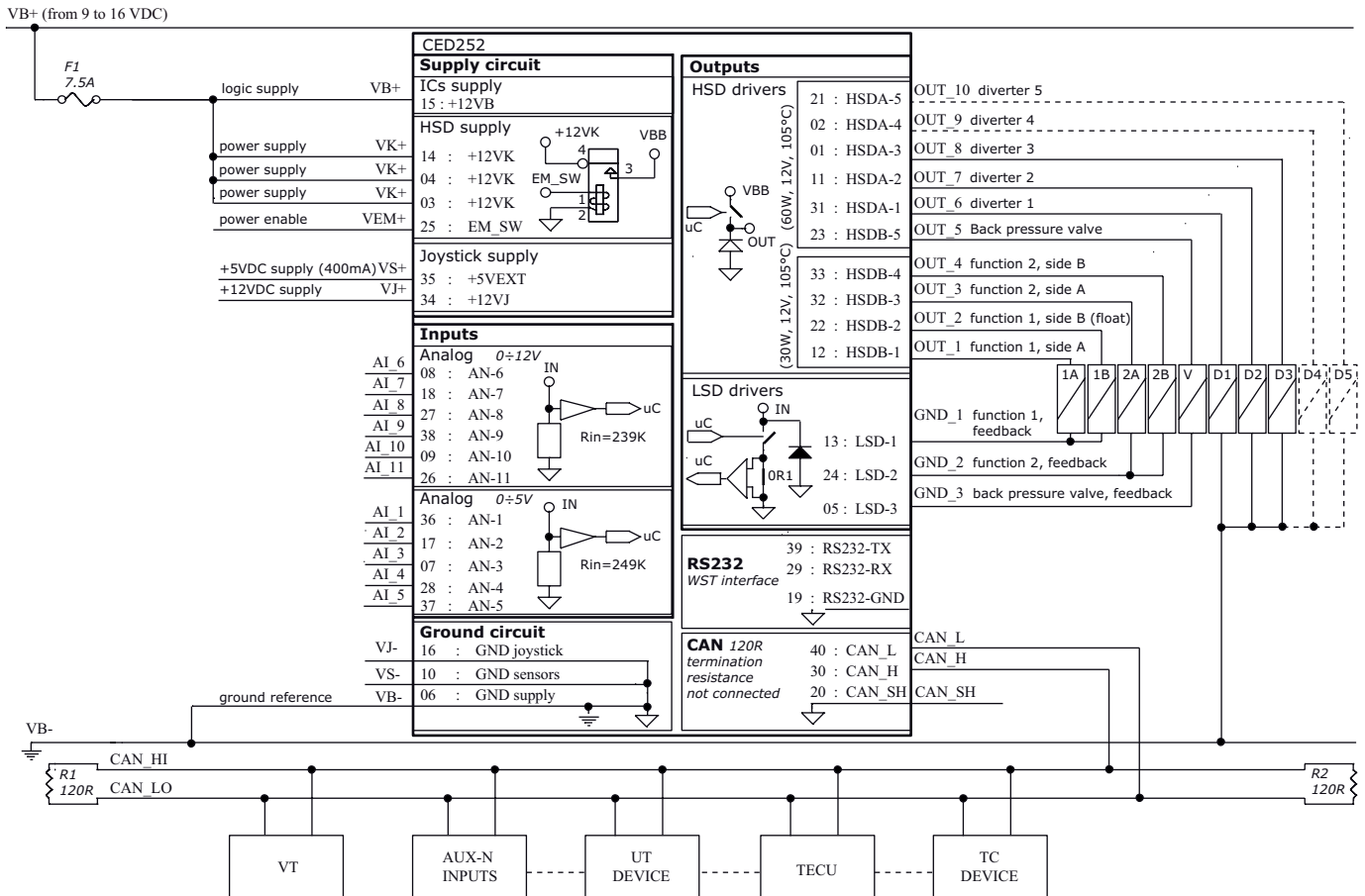
System diagram

Standard circuit configuration

CED252 electronic control unit

System diagram

ISOBUS circuit configuration

VB+ (from 9 to 16 VDC)

F1
7.5A

CED252	
Supply circuit	**Outputs**

logic supply · VB+

ICs supply
15 : +12VB

HSD supply · +12VK · VBB
power supply · VK+ · 14 : +12VK · 4
power supply · VK+ · 04 : +12VK · EM_SW · 3
power supply · VK+ · 03 : +12VK · 1
power enable · VEM+ · 25 : EM_SW · 2

+5VDC supply (400mA) VS+
+12VDC supply · VJ+

Joystick supply
35 : +5VEXT
34 : +12VJ

Inputs

Analog *0÷12V* · IN
AI_6 · 08 : AN-6
AI_7 · 18 : AN-7
AI_8 · 27 : AN-8 · uC
AI_9 · 38 : AN-9
AI_10 · 09 : AN-10 · Rin=239K
AI_11 · 26 : AN-11

Analog *0÷5V* · IN
AI_1 · 36 : AN-1
AI_2 · 17 : AN-2 · uC
AI_3 · 07 : AN-3 · Rin=249K
AI_4 · 28 : AN-4
AI_5 · 37 : AN-5

Ground circuit
VJ- · 16 : GND joystick
VS- · 10 : GND sensors
ground reference · VB- · 06 : GND supply

VB-

HSD drivers
21 : HSDA-5 · OUT_10 diverter 5
02 : HSDA-4 · OUT_9 diverter 4
01 : HSDA-3 · OUT_8 diverter 3
11 : HSDA-2 · OUT_7 diverter 2
31 : HSDA-1 · OUT_6 diverter 1
VBB · 23 : HSDB-5 · OUT_5 Back pressure valve
uC · OUT

(60W, 12V, 105°C)

33 : HSDB-4 · OUT_4 function 2, side B
32 : HSDB-3 · OUT_3 function 2, side A
22 : HSDB-2 · OUT_2 function 1, side B (float)
12 : HSDB-1 · OUT_1 function 1, side A

(30W, 12V, 105°C)

1A 1B 2A 2B V D1 D2 D3 D4 D5

LSD drivers · IN
uC
uC · 13 : LSD-1 · GND_1 function 1, feedback
0R1 · 24 : LSD-2 · GND_2 function 2, feedback
05 : LSD-3 · GND_3 back pressure valve, feedback

RS232
WST interface
39 : RS232-TX
29 : RS232-RX
19 : RS232-GND

CAN *120R*
termination resistance not connected
40 : CAN_L · CAN_L
30 : CAN_H · CAN_H
20 : CAN_SH · CAN_SH

R1 120R · CAN_HI
CAN_LO

R2 120R

VT	AUX-N INPUTS	UT DEVICE	TECU	TC DEVICE

Accessories

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	DTM06-12SA Deutsch	CED100X - CED400X control units
D12F	DTM04-12PA Deutsch	Harness
C1+C2	SUB-D 9 poles, female	Personal computer
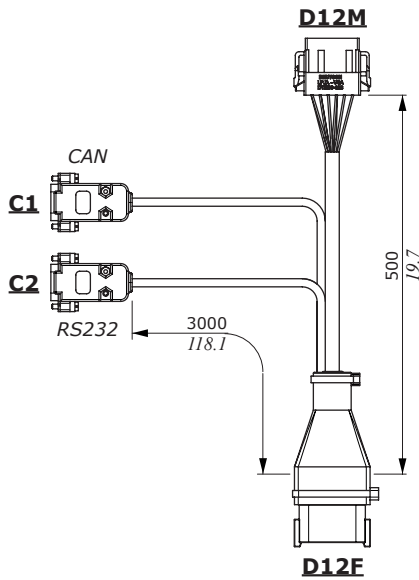
Electrical wiring
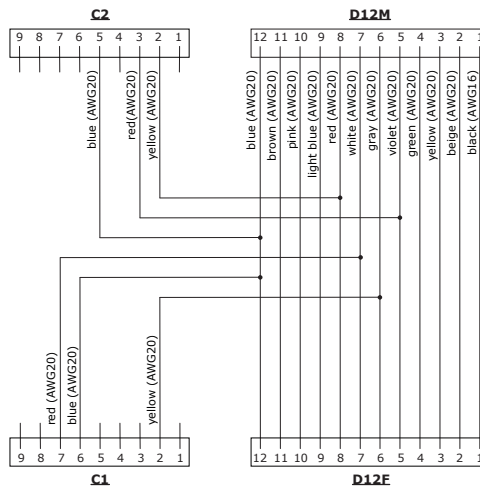
Connector PIN-OUT		
Pin	**Functions**	
	C1 conn.	**C2 conn.**
1	not connected	not connected
2	CAN_L	Tx
3	not connected	Rx
4	not connected	not connected
5	not connected	GND
6	GND	not connected
7	CAN_H	not connected
8	not connected	not connected
9	not connected	not connected

For CED040-CED160 control unit

Code	VCAV600021
Description	CED040-CED160 programming cable
Notes	CAN bus programming

Connector types		
ID	**Type**	**Connection to**
D12M	DTM06-12SA Deutsch	CED040-CED160 control units
D12F	DTM04-12PA Deutsch	Harness
C1	SUB-D 9 poles, female	Personal computer
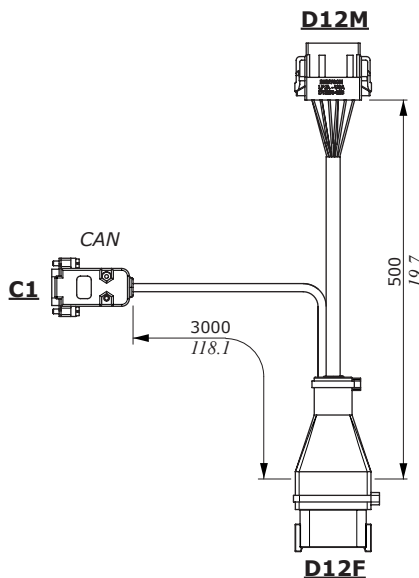
Electrical wiring
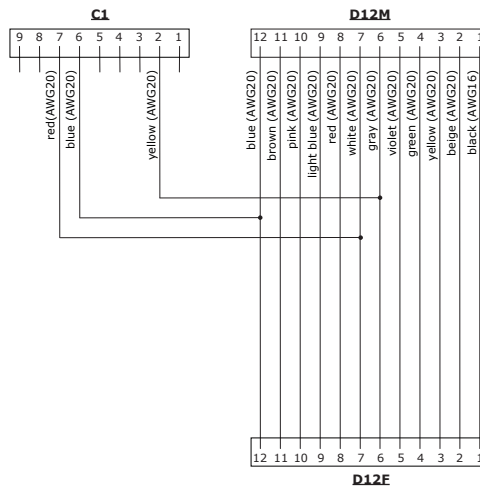
C1 connector PIN-OUT	
Pin	**Functions**
1	not connected
2	CAN_L
3	not connected
4	not connected
5	not connected
6	GND
7	CAN_H
8	not connected
9	not connected

For CED252 control unit

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

Electrical wiring

JP2

JP1

3000
118.1

JP2
3 2 1

red (AWG20)
yellow (AWG20)
blue (AWG20)

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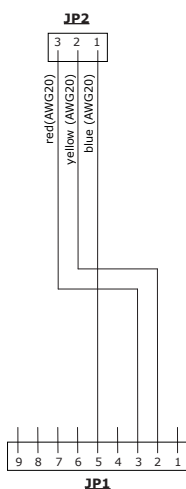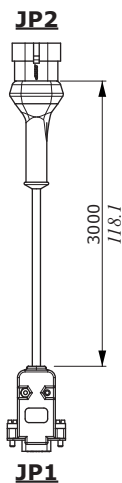
Connector PIN-OUT		
Pin	**Functions**	
	JP1 conn.	**JP2 conn.**
1	not connected	GND
2	Tx	Tx
3	Rx	Rx
4	not connected	/
5	GND	/
6	not connected	/
7	not connected	/
8	not connected	/
9	not connected	/

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

Accessories
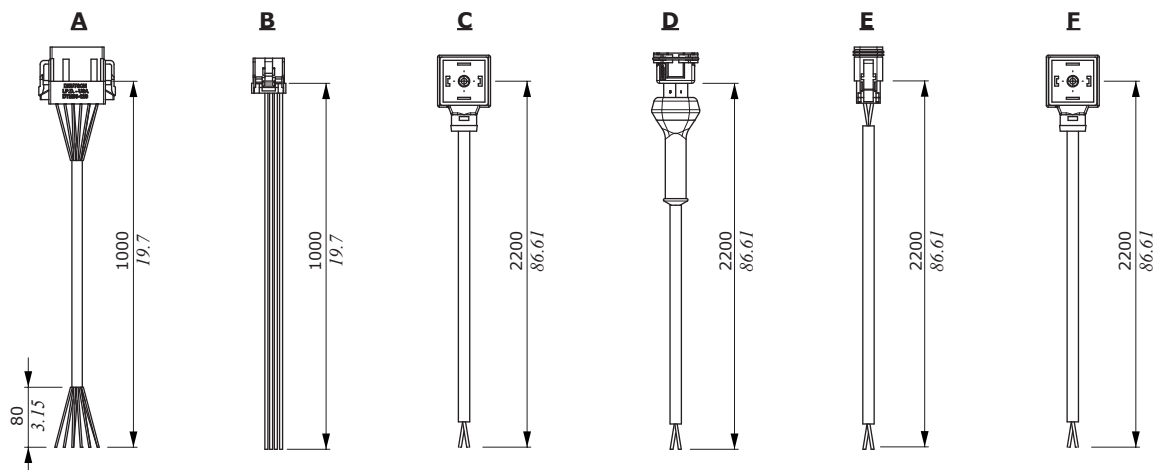
Cable kit

	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
F	VCAV100007	ISO4400	Solenoid valves

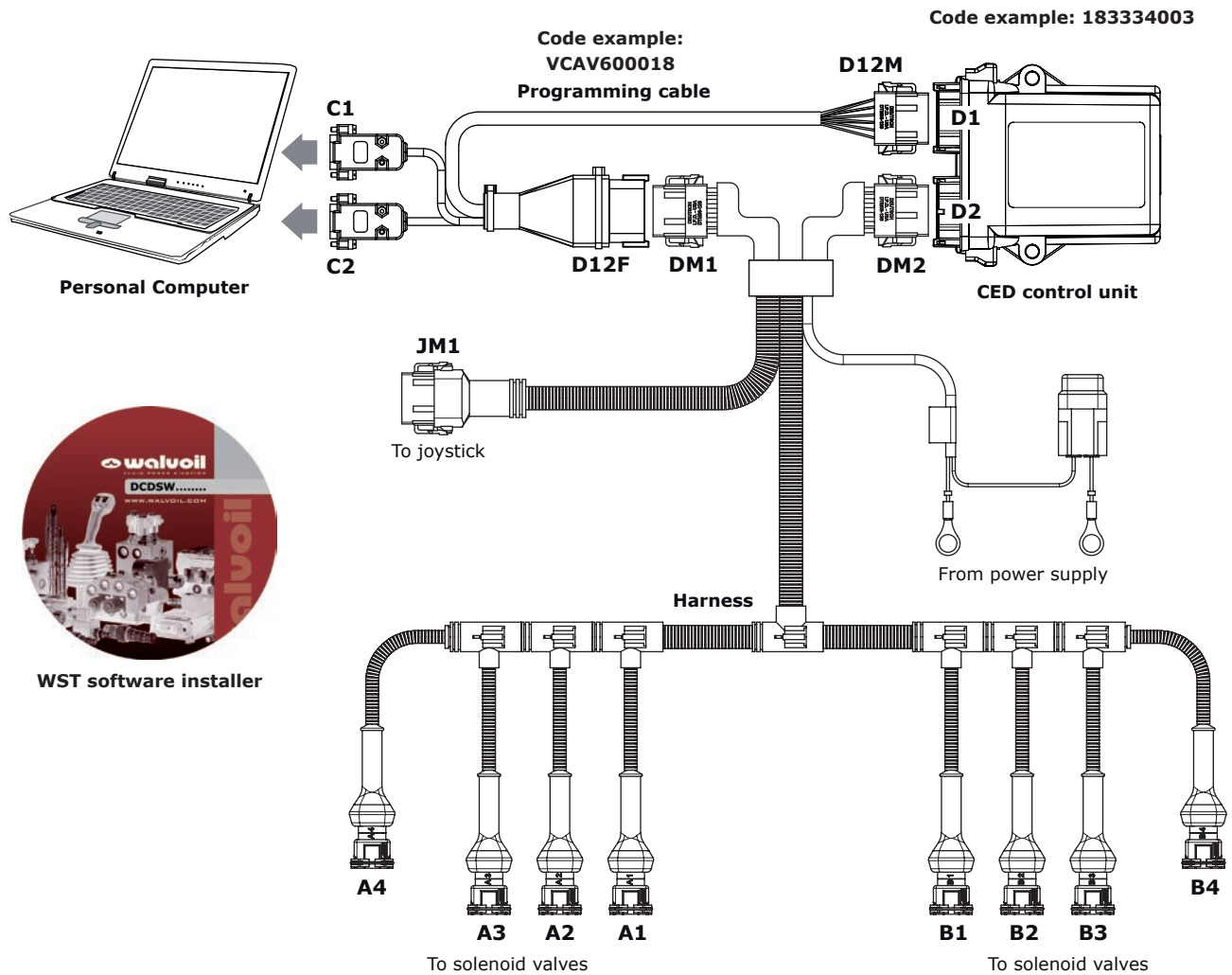|	Wire colour and section					
Pin	**A cable**	**B cable**	**C cable**	**D cable**	**E cable**	**F cable**
1	brown (AWG20)	not connected	brown (AWG18) Valve -	blue (AWG18) Valve +	blue (AWG18) Valve +	brown (AWG18) Valve -
2	white (AWG20)	not connected	blue (AWG18) Coil 1 +	brown (AWG18) Valve -	brown (AWG18) Valve -	blue (AWG18) Coil 1 +
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	/	/	/	/

Accessories

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.

Code example: 183334003

Code example: VCAV600018 Programming cable

D12M

D1

C1

C2

D12F   DM1

D2

DM2

Personal Computer

CED control unit

JM1

To joystick

From power supply

WST software installer

Harness

A4

A3   A2   A1

To solenoid valves

B1   B2   B3

B4

To solenoid valves