

Fully configurable dedicated 1U 6-channel system interface unit for ultra-stable, high precision fluxgate technology current transducers

Features

- 6 channels with D-sub-9 connector
- ± 15 V DC supply output with up to 2.2 A per channel
- Universal mains (90-264 V 50/60 Hz) and 127-370 V dc input
- Output voltage with XLR mini connectors
- Access to calibration windings on all channels
- 19" rack mount 1U height
- Power and status LEDs on front
- 15-pin DSUB connector provides access to isolated status signals of each transducer and power
- 6 slots for 1 V or 10 V voltage output modules (VOM)



Description

Power supply and interface unit with industry standard D-sub-9 connectors for interfacing a range of DC current transducers (DCCTs). With configurable voltage output modules (VOM) for all 6 channel it makes precision current sensing easy and convenient.

The Ultra-stable 1V or 10V VOM converts output current of the connected transducers to an accurate voltage reading.

Housed in a rack mountable metal case and powered by universal mains, the DSSIU-6-1U-V is a reliable and complete solution for implementation of fluxgate current sensing technology.

Applications

- Fluxgate DCCTs
- Hall effect DCCTs
- Power measurement
- Electric vehicle (EV) test bench
- Power measurement and power analysis
- Particle accelerators
- Current calibration purposes
- Precision current sensing

Electrical specifications

Table 1: Power supply specifications

Parameter	Symbol	Unit	Min	Typ.	Max	Comment
AC Input Voltage	V_{AC}	V_{RMS}	90		264	
AC Input Current	I_{AC}	A_{RMS}		2.2		At rated output current
AC Input Current	I_{AC}	A_{RMS}		1.1		At rated output current
AC Input Frequency	f	Hz	50		60	
DC Input Voltage	V_{DC}	V	127		370	
Output Voltage	U_{cc}	V_{DC}	± 14.75		± 15.75	
Output Current	I_{cc}	A			2.2	Per channel
	I_{cc}	A			1.65	Per channel (2.2 A if using only 4 channels)
Output Voltage Ripple		mV_{RMS}			15	No load
Full Operating temperature range	T_a	$^{\circ}C$	0		40	To full rated output current
Storage temperature range		$^{\circ}C$	-20		85	
Relative humidity		%	20		80	Non-condensing
Altitude		m			2000	
Usage						Designed for indoor use
Pollution degree					2	
Ingress protection rating					IP20	
Mass		kg		5.1		
Dimensions	W x H x D	mm		483 x 44 x 271		
EMC standard						EN 61326-1:2013
Safety standard						IEC 61010-1:2010/A1:2019

Voltage Output Module Parameters

Ratio: Output/input transfer ratio.

DC current: Rated continuous DC current rating of the VOM.

DC voltage: Resulting output voltage when the input current is equal to the nominal dc current.

AC current: Rated RMS current.

AC voltage: Resulting RMS voltage output when the input current is equal to the nominal AC current.

Table 2: Voltage output module (VOM) selection table with nominal values

VOM	Ratio [V/A]	Input impedance [Ω]	Output impedance [Ω]	DC current [A]	DC voltage [V]	AC current [A RMS]	AC voltage [V RMS]	Partnumber
VOM0100-10	100.000	11.111	<1	0.100	10.000	0.067	6.667	2514200038
VOM0300-10	33.333	3.704	<1	0.300	10.000	0.200	6.667	2514200042
VOM0333-10	30.000	3.333	<1	0.333	10.000	0.222	6.667	2514200080
VOM0400-10	25.000	2.778	<1	0.400	10.000	0.267	6.667	2514200036
VOM0667-10	15.000	1.667	<1	0.667	10.000	0.444	6.667	2514200069
VOM0800-10	12.500	1.389	<1	0.800	10.000	0.533	6.667	2514200071
VOM0100-1	10.000	10.000	50	0.150	1.500	0.100	1.000	2514200037
VOM1333-10	7.500	0.833	<1	1.333	10.000	0.889	6.667	2514200060
VOM0300-1	3.333	3.333	50	0.450	1.500	0.300	1.000	2514200068
VOM0333-1	3.000	3.000	50	0.500	1.500	0.333	1.000	2514200079
VOM0400-1	2.500	2.500	50	0.600	1.500	0.400	1.000	2514200035
VOM0667-1	1.500	1.500	50	1.000	1.500	0.667	1.000	2514200073
VOM0800-1	1.250	1.250	50	1.200	1.500	0.800	1.000	2514200070
VOM1333-1	0.750	0.750	50	2.000	1.500	1.333	1.000	2514200029

Table 3: Voltage output module (VOM) electrical performance specifications at 23 °C, when used with a suitable Danisense transducer

VOM	Ratio error	Ratio Temp. Coef.	Ratio stability	Linearity	Offset	Offset temp. coef.	Bandwidth	RMS noise < 100 kHz
VOM0100-10	50 ppm	3 ppm/K	5 ppm/month	5 ppm	3 μV	0.2 μV/K	500 kHz	1200 μV
VOM0300-10	50 ppm	3 ppm/K	5 ppm/month	10 ppm	3 μV	0.2 μV/K	500 kHz	300 μV
VOM0333-10	50 ppm	3 ppm/K	5 ppm/month	10 ppm	3 μV	0.2 μV/K	500 kHz	300 μV
VOM0400-10	50 ppm	3 ppm/K	5 ppm/month	10 ppm	3 μV	0.2 μV/K	500 kHz	300 μV
VOM0667-10	50 ppm	3 ppm/K	5 ppm/month	10 ppm	3 μV	0.2 μV/K	500 kHz	360 μV
VOM0800-10	50 ppm	3 ppm/K	5 ppm/month	10 ppm	3 μV	0.2 μV/K	500 kHz	360 μV
VOM0100-1	50 ppm	2.5 ppm/K	5 ppm/month	5 ppm	0 μV	0 μV/K	3 MHz	120 μV
VOM1333-10	100 ppm	3 ppm/K	5 ppm/month	30 ppm	3 μV	0.2 μV/K	500 kHz	360 μV
VOM0300-1	50 ppm	2.5 ppm/K	5 ppm/month	10 ppm	0 μV	0 μV/K	3 MHz	120 μV
VOM0333-1	50 ppm	2.5 ppm/K	5 ppm/month	10 ppm	0 μV	0 μV/K	3 MHz	120 μV
VOM0400-1	50 ppm	2.5 ppm/K	5 ppm/month	10 ppm	0 μV	0 μV/K	3 MHz	120 μV
VOM0667-1	50 ppm	2.5 ppm/K	5 ppm/month	10 ppm	0 μV	0 μV/K	2 MHz	120 μV
VOM0800-1	50 ppm	2.5 ppm/K	5 ppm/month	10 ppm	0 μV	0 μV/K	1 MHz	120 μV
VOM1333-1	100 ppm	2.5 ppm/K	5 ppm/month	30 ppm	0 μV	0 μV/K	1 MHz	120 μV

Table 4: VOM dc voltages with selected transducers at nominal currents

	DT50ID	DS50ID	DT100ID	DT200ID	DS200ID	DS300ID	DS400ID	DQ500ID	DS600ID/DQ600ID
Transducer Ratio	1/500	1/500	1/1000	1/1000	1/500	1/1000	1/2000	1/1750	1/1500
Nominal current (A dc)	50	75	100	200	300	450	600	750	900
VOM0100-10	10.000	10 (@ 50 A dc)	10.000	10 (@ 100 A dc)	-	-	-	-	-
VOM0300-10	3.333	5.000	3.333	6.667	-	-	10.000	-	-
VOM0333-10	3.000	4.500	3.000	6.000	-	-	9.000	-	-
VOM0400-10	2.500	3.750	2.500	5.000	10 (@ 200 A dc)	11.250	7.500	10.714	10 (@600 A dc)
VOM0667-10	1.500	2.250	1.500	3.000	9.000	6.750	4.500	6.429	9.000
VOM0800-10	1.250	1.875	1.250	2.500	7.500	5.625	3.750	5.357	7.500
VOM0100-1	1.000	1.500	1.000	1 (@ 100 A dc)	-	-	-	-	-
VOM1333-10	0.750	1.125	0.750	1.500	4.500	3.375	2.250	3.214	4.500
VOM0300-1	0.333	0.500	0.333	0.667	-	1.500	1.000	1.429	1.33 (@ 600 A dc)
VOM0333-1	0.300	0.450	0.300	0.600	1.2 (@ 600 A dc)	1.350	0.900	1.286	1.2 (@ 600 A dc)
VOM0400-1	0.250	0.375	0.250	0.500	1.500	1.125	0.750	1.071	1.500
VOM0667-1	0.150	0.225	0.150	0.300	0.900	0.675	0.450	0.643	0.900
VOM0800-1	0.125	0.188	0.125	0.250	0.750	0.563	0.375	0.536	0.750
VOM1333-1	0.075	0.113	0.075	0.150	0.450	0.338	0.225	0.321	0.450

Table 5: Continued: VOM dc voltages with selected transducers at nominal currents

	DN1000ID	DM1200ID	DL2000ID	DQ640ID
Transducer Ratio	1/1500	1/1500	1/1500	progr.
Nominal current (A dc)	1000	1500	3000	40-640
VOM0100-10	-	-	-	
VOM0300-10	-	-	-	
VOM0333-10	-	-	-	
VOM0400-10	10 (@600 A dc)	-	-	
VOM0667-10	10.000	-	-	
VOM0800-10	8.333	12.500	-	Depends on progr.
VOM0100-1	-	-	-	
VOM1333-10	5.000	7.500	10 (@ 2000A dc)	
VOM0300-1	-	-	-	
VOM0333-1	-	-	-	
VOM0400-1	1.5 (@ 900 A dc)	-	-	
VOM0667-1	1.000	1.500	-	
VOM0800-1	0.833	1.250	-	
VOM1333-1	0.500	0.750	1.500	

Mechanical drawing

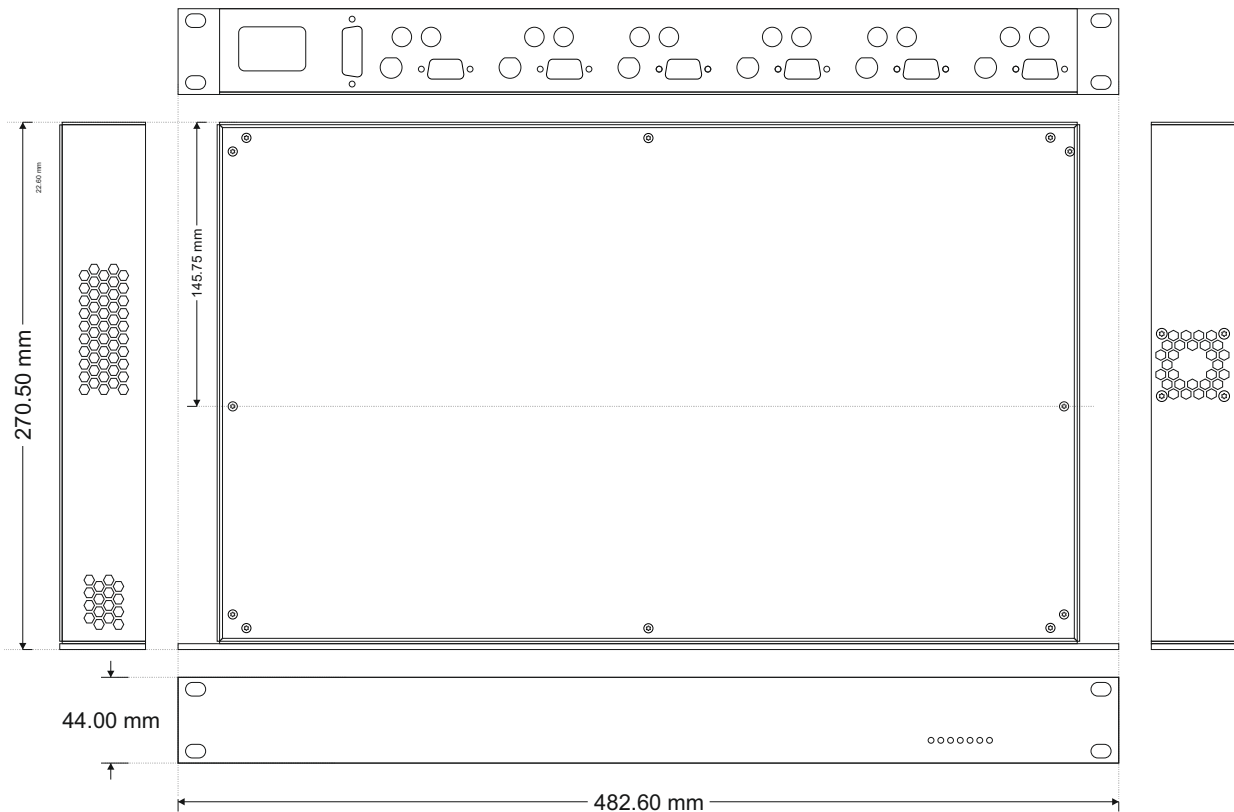


Figure 1: Mechanical Dimensions. Tolerance is 0.3 mm

Connections

Each channel has a D-sub-9 female connector to interface with the sensor head (Fig. 3), and XLR mini connection for the output voltage reading (Fig. 4) and a positive and negative calibration current banana terminal. Furthermore, there is a D-sub-15 female connector to read the status of all channels, according to Table 6. The backplate with connection outlines is shown in Fig. 2.

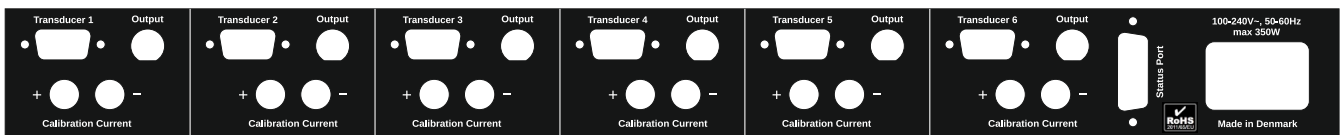


Figure 2: rear connection panel

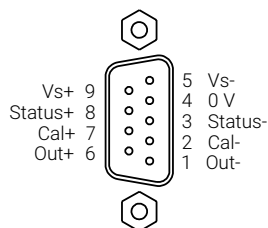


Figure 3: D-sub-9 connection pinout

D-sub-9 pin description:

- 1 Out- Measurement output negative terminal
- 2 Cal- Calibration winding negative terminal
- 3 Status- Status signal negative terminal
- 4 0 V 0 V connection for supply voltage
- 5 Vs- Negative supply voltage
- 6 Out+ Measurement output positive terminal
- 7 Cal+ Calibration winding positive terminal
- 8 Status+ Status signal positive terminal
- 9 Vs+ Positive supply voltage

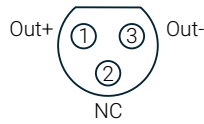


Figure 4: XLR mini voltage reading output connector pinout. Recommended connector: AF3F Amphenol.

Status port

The status port provides access to the status of the system via optically isolated pins in a DSUB15. The optocoupler output can be used with a pullup resistor limiting current below 100 mA at 1 V on the (+) pin, see Fig. 5. See Table 6 for pin connections for each channel.

Example: 5V supply, resistor of 1kOhm is connected between 5V and + of channel 1 (pin 1) and pin 9 is connected to 0V. If the transducer is working correctly pin 1 and 9 are shorted with above optocoupler circuit. The voltage on pin 1 will be around 1V and current $I_{@}=(5V-1V)/1kOhm=4mA$.

Status port	(+) terminal	(-) terminal
Channel 1	1	9
Channel 2	2	10
Channel 3	3	11
Channel 4	4	12
Channel 5	5	13
Channel 6	6	14

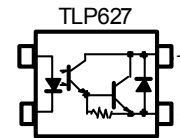


Figure 5: Status signal optocoupler

Table 6: Status port D-sub-15 connection pinout. Current direction is from (+) to (-)

Intended use



To ensure safety protection, only use the device as described by the manufacturer

The DSSIU-6-1U-V is designed to power up to six current transducers such as Danisense DT, DS, DQ, DN, DM, DL series or similar. Please see the product manual: <https://danisense.com/user-manual>.

- Cleaning only with a damp cloth
- Power/unpower the device by plugging/unplugging the mains power cord
- Always keep mains power cord accessible

Instruction for use

1. Do not power up the device before all cables are connected.
2. If the DSSIU-6-1U-V is intended for desk use, mount the rubber feet which are part of the package.
3. If the DSSIU-6-1U-V is intended for Rack mounting, use the screw kit for mounting and do not mount the rubber feet.
4. Place the primary conductor through the aperture of the transducer.

5. Connect a D-sub-9 cable between the DSSIU-6-1U-V and sensor.
6. Connect a high impedance voltmeter or power analyzer on the output (XLR mini connector).
7. When all connections are secured - connect mains power.
8. Apply primary current.

Safety Instructions

DO NOT TRY TO DISASSEMBLE THE UNIT. Make sure that the unit is properly connected to earth ground (through IEC power inlet). Do not block the ventilation openings on the side panels. If the fan does not operate properly, or if the green "POWER" LED is not lit when mains is applied, disconnect power and contact Danisense for further instruction.

Front panel LEDs

If the leftmost LED is ON, it indicates that the DSSIU-6-1U-V is powered. The following 1 to 6 LEDs indicate the status signal (if available) of their corresponding transducer connected to the channel of the same number in the rear DSSIU-6-1U-V panel.

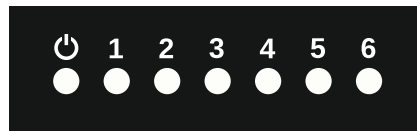


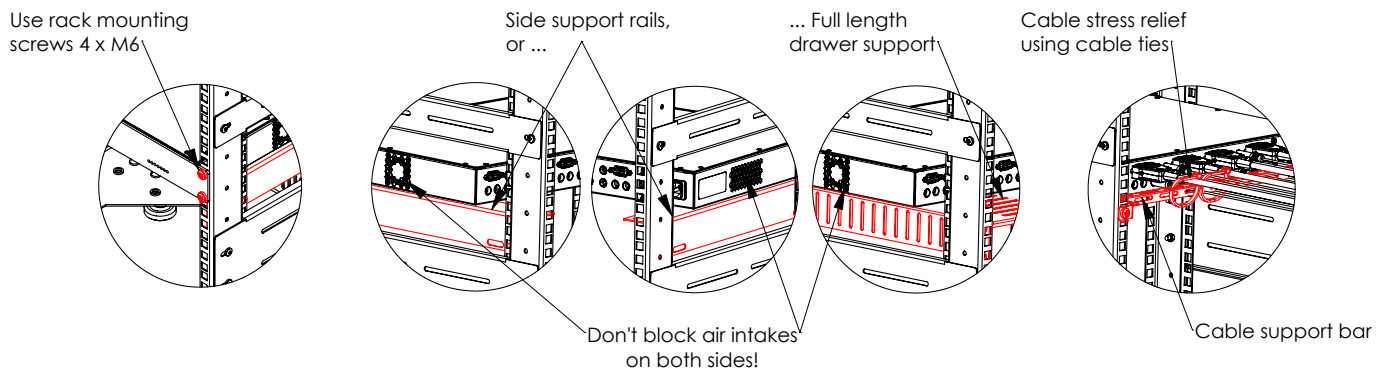
Figure 6: Front panel LEDs

Connections

- (Front) D-sub-9 connector for connecting the transducer cable with the DSSIU-6-1U-V
- (Front) BNC connector for voltage output
- (Back) 3 pole IEC mains power connector
- (Back) 4 pin connector to read STATUS and TEDS signals fed through from the transducer

Instructions for rack mounting

To avoid damaging equipment, observe following guidelines when mounting the device in a rack:



Package contents

- 2m mains power cable—region specific
- DSSIU-6-1U-V
- 4 x rubber feet
- 4 x rack screws with nuts
- Manual/datasheet

Calibration winding access

Each channel gives access to the calibration winding of transducers with this feature. Currently the following transducers do support this functionality.

- DS200ID-CD1000 - 1000 turns calibration winding (Max 200mA) - Equals a primary current of 200A
- DS200ID-CD100 - 100 turns calibration winding (Max 100mA) - Equals a primary current of 10A
- DS600ID-CD100 - 100 turns calibration winding (Max 100mA) - Equals a primary current of 10A
- DL2000ID-CD100 - 100 turns calibration winding (Max 100mA) - Equals a primary current of 10A

Each transducers calibration winding can be driven either in series with the other transducers or independently with its own power supply. When using the DS200ID-CD1000, it is possible to do a full scale calibration from -200A to 200A.

Principle for calibration

It is important to use a stable current source. If the current source is calibrated then there is no need for an Ampere- meter on the calibration current. Example for DS200ID-CD1000 on channel X configured with a 1V voltage module:

1. Connect transducer to channel X on DSSIU-6-1U-V
2. Ensure light is on for channel X on the frontside of the DSSIU-6-1U-V - meaning the transducer is in normal operation
3. Ensure no primary current through the transducer
4. Read the voltage output from channel X - This is the offset of the transducer $V(\text{offset})$
5. Connect a stable current source to the calibration winding of channel X - +100mA
6. Let the current stabilize according to current source specification
7. Measure the voltage - $V(100A)$
8. Change polarity of the calibration current (Either by swapping the calibration cable from + to -, or by changing the polarity directly on the current source if possible)
9. Let the current stabilize according to current source specification
10. Measure the voltage - $V(-100A)$

$V_{out}(100A)$ theoretical is 0.5V or 5V depending on voltage module installed. $V_{out}(-100A)$ theoretical is -0.5V or -5V depending on voltage module installed. When evaluating the transducer performance it is important to take the different uncertainties of the measurement instruments into account.