DSSIU-6-1U-V

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

Powers up to 6 x DS50 to DS2000 at the same time.

Features

- Compact 19” rack mount 1U height
- Output voltage from current transducers are available in XLR mini connectors
- Individual or serial access to calibration windings of all 6 transducers via 4mm banana plugs
- 15-pin DSUB connector provides access to isolated status signals of each transducer and power
- 6 slots for voltage output modules (VOM)
- Front LEDs indication of normal operation for each transducer and power LED for DSSIU-6-1U -V
- Forced cooling ensuring stable temperatures for VOM
- Universal autorange (100-240V AC 50/60Hz) AC input voltage or 120–370V DC input voltage.

VOM:

- Ultra-stable 1V or 10V voltage output modules VOM for conversion of transducer’s output current to a voltage

Specifications

Parameter	Symbol	Unit	Min	Typ.	Max	Comment
Mains input						
AC input voltage	V_{AC}	V_{rms}	85		264	Autoranging
AC nominal current	I_{AC}	I_{rms}			2.1A @ 115V 1.1A @ 230V	Full scale operation with 6 DS2000 and 3000A primary
Frequency	f	Hz	47		63	Autoranging
Transducer output port						
Supply voltage	U_{cc}		±14.75		±15.75	x6 channels
Ripple		mV_{rms}			15	
Environment and Mechanical						
Ambient operating temperature range	T_a	ºC	5		40	
Storage temperature range		ºC	-20		85	
Relative humidity		%	20		80	
Mass		Kg		5.1		
Size (W x H x D)		mm				483 x 44 x 271
Status Port (Isolated output)						
Collector-Emitter current		mA			100	
Collector-Emitter Voltage off		V			100	
reverse collector emitter voltage, off		V			0.3	
Collector-Emitter voltage, on		V			1.2	@100mA
Isolation to chassis		v			300	
Voltage output - 10V version						
Offset error - Initial - Versus temperature					Offset error - 6 ppm - 1 ppm/K	Add error from transducer
Ratio error - Initial - Versus temperature - Versus time					Ratio error - 10 ppm - 2 ppm/K - 20 ppm/month	Add error from transducer
Linearity error		ppm			13	
Voltage output - 1V version						
Offset error - Initial - Versus temperature - Versus time					Offset error - 0 ppm - 0 ppm/K - 0 ppm/month	Add error from transducer
Ratio error - Initial - Versus temperature - Versus time					Ratio error - 10 ppm - 1 ppm/K - 20 ppm/month	Add error from transducer
Linearity error		ppm			11	

Channel configuration

Each channel does have 4 connectors.

- Transducer (DSUB9) for connection to the transducer
- YELLOW Calibration + (4mm Banana) the positive connection for the calibration current
- YELLOW Calibration - (4mm Banana) the negative connection for the calibration current
- Voltage output (XLR mini)

Current output configuration

At the present state it is not possible to buy the DSSIU-6-1U-V with a channel configured as current output.

VOM variants and their rated currents and voltages

VOM	Ratio (V/A)	Nominal current (A dc)	Nominal voltage (V dc)	Nominal current (A ac rms)	Nominal voltage (V ac)
VOM0100-10	100.000	0.100	10.000	0.067	6.667
VOM0300-10	33.333	0300	10.000	0.200	6.667
VOM0400-10	25.000	0.400	10.000	0.267	6.667
VOM0667-10	15.000	0.667	10.000	0.428	6.667
VOM0800-10	12.500	0.800	10.000	0533	6.667
VOMO0100-1	10.000	0150	1.500	0.100	1.000
VOM1333-10	7.500	1333	10.000	0.889	6.667
VOM0300-1	3.333	0450	1.500	0.300	1.000
VOM0400-1	2.500	0.600	1.500	0.400	1.000
VOMO667-1	1.500	1.000	1.500	0.667	1.000
VOM0800-1	1.250	1.200	1.500	0.800	1.000
VOM1333-1	0.750	2.000	1.500	1333	1.000

Voltage output configuration

The DSSIU-6-1U-V has 6 channels that can be configured with different voltage modules.

Please see attached matrix with the various options:
If the output is configured as a voltage output it is important to ensure that the transducers are not attached to the wrong channels.

VOM selection matrix with different transducers and currents

	DT50ID	DS50ID	DT100ID	DT200ID	DS200ID	DS300ID	DS400ID	DQ500ID	DS600ID/DQ600ID	DN1000ID	DM1200ID	DL2000ID	DQ640ID
Transducer Ratio	1/500	1/500	1/1000	1/1000	1/500	1/1000	1/2000	1/1750	1/1500	1/1500	1/1500	1/1500	progr.
Nominal current (A dc)	50	75	100	200	300	450	600	750	900	1000	1500	3000	40-640
VOM0100-10 (V dc)	10.000	10 (@ 50 A dc)	10.000	10 (@ 100 A dc)	-	-	-	-	-	-	-	-	
VOM0300-10 (V dc)	3.333	5.000	3.333	6.667	-	-	10.000	-	-	-	-	-	
VOM0400-10 (V dc)	2.500	3.750	2.500	5.000	10 (@ 200 A dc)	11.250	7.500	10.714	10 (@600 A dc)	10 (@600 A dc)	-	-	
VOM0667-10 (V dc)	1.500	2.250	1.500	3.000	9.000	6.750	4.500	6.429	9.000	10.000	-	-	
VOM0800-10 (V dc)	1.250	1.875	1.250	2.500	7.500	5.625	3.750	5.357	7.500	8.333	12.500	-	
VOM0100-1 (V dc)	1.000	1.500	1.000	1 (@ 100 A dc)	-	-	-	-	-	-	-	-	Depends
VOM1333-10 (V dc)	0.750	1.125	0.750	1.500	4.500	3.375	2.250	3.214	4.500	5.000	7.500	10 (@ 2000A dc)	on progr.
VOM0300-1 (V dc)	0.333	0.500	0.333	0.667	-	1.500	1.000	1.429	1.33 (@ 600 A dc)	-	-	-	
VOM0400-1 (V dc)	0.250	0.375	0.250	0.500	1.500	1.125	0.750	1.071	1.500	1.5 (@ 900 A dc)	-	-	
VOM0667-1 (V dc)	0.150	0.225	0.150	0.300	0.900	0.675	0.450	0.643	0.900	1.000	1.500	-	
VOM0800-1 (V dc)	0.125	0.188	0.125	0.250	0.750	0.563	0.375	0.536	0.750	0.833	1.250	-	
VOM1333-1 (V dc)	0.075	0.113	0.075	0.150	0.450	0.338	0.225	0.321	0.450	0.500	0.750	1.500	

Example 1: A DS2000 is wrongly connected to a DS200 voltage output channel. The over current will burn a non recovering fuse inside the DSSIU-6-1U-V to protect the current to voltage module from damage.
Example 2: A DS200 is wrongly connected to a DS2000 voltage output channel. The DS200 does not create an overcurrent, but the output voltage will be wrong.

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 is series with the other transducers or independently with it's 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(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)

Vout(100A) theoretical is 0.5V or 5V depending on voltage module installed.
Vout(-100A) theoretical is -0.5V or -5V depending on voltage module installed.

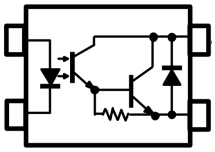
When evaluating the transducer performance it is important to take the different uncertainties of the measurement instruments into account.

Status port

The status port provides access to the status of the system via optical isolated pins in a DSUB15.

Overview: (Current direction is from + to -)

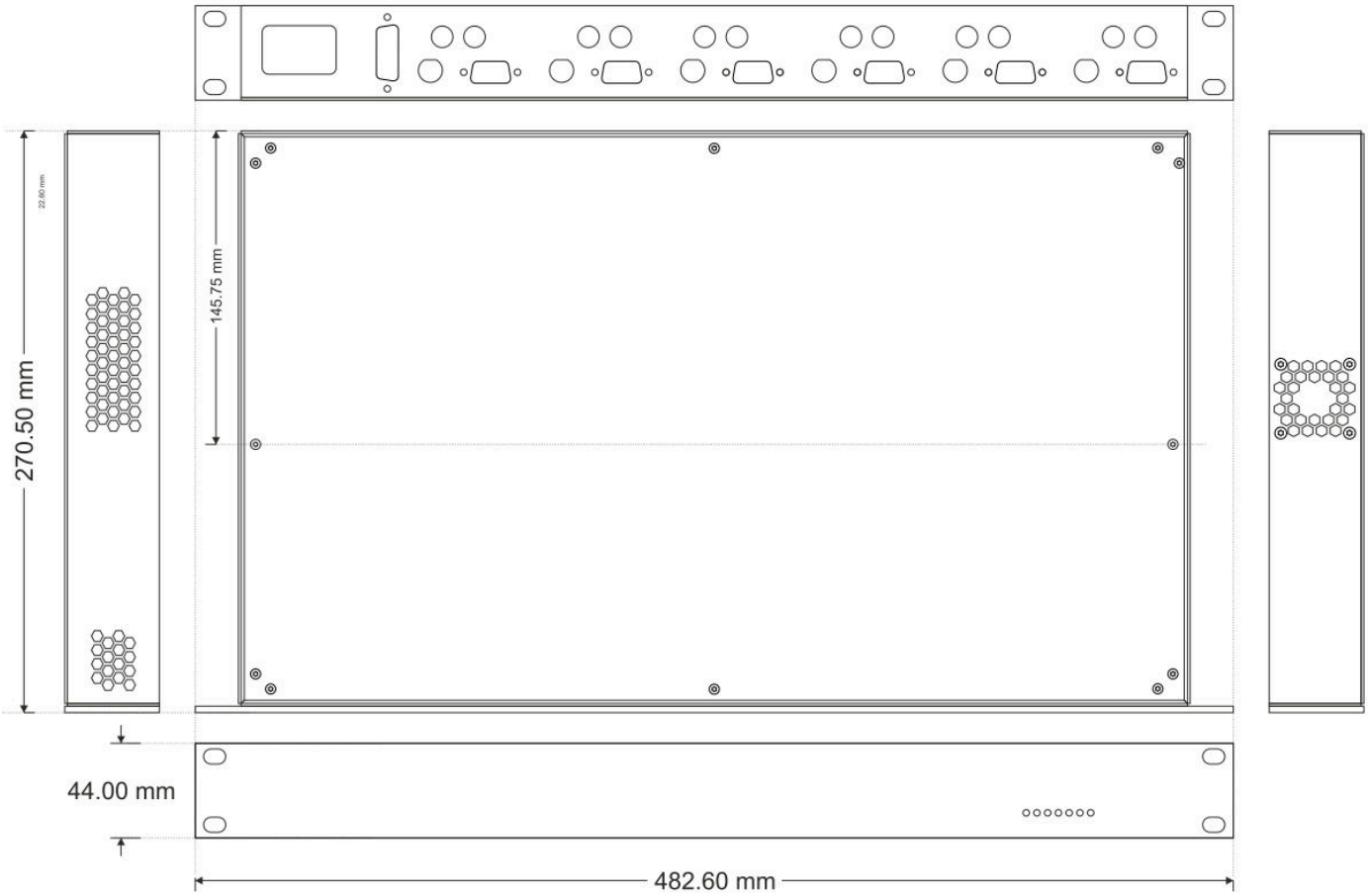
Status Port	+	-
Channel 1	1	9
Channel 2	2	10
Channel 3	3	11
Channel 4	4	12
Channel 5	5	13
Channel 6	6	14



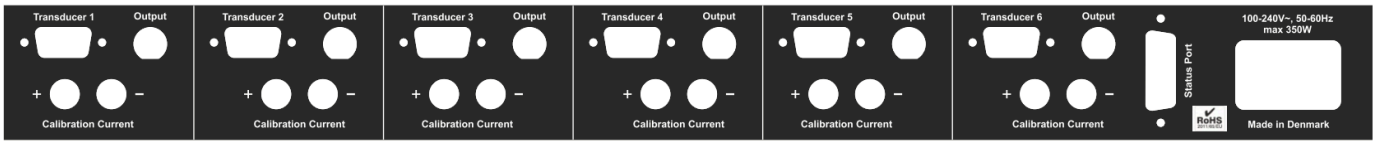
Use a pull up resistor value which does not exceed 100mA when the (+) pin is @ 1V.

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

Mechanical Dimensions



Connection overview

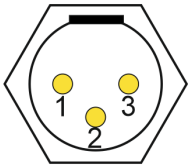


Package content

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

Output connection

Mini XLR connector seen from the outside
Pin 1: Positive current or voltage dependent on configuration
Pin 3: Return current or 0V dependent on configuration
Recommended connector: AG3F Amphenol



User Guide

Intended use:

The DSSIU-6-1U-V is intended to be used for powering up to six Danisense current sensors.
The sensors which can be powered are all 200A, 600A, 900A and 2000A transducers.

Instruction for use:

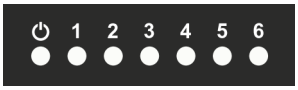
1. Do not power up the device before all cables are connected
2. Only use cable provided by Danisense to ensure correct wiring and dimension of cable.
3. If the DSSIU-6-1U-V is intended for desk use, mount the rubber feet which are part of the package.
4. If the DSSIU-4 is intended for Rack mounting, use the screw kit for mounting and do not mount the rubber feet.
5. Connect a DSUB cable between DSSIU-6-1U-V and each sensor
6. Connect a low impedance amperemeter, measuring resistor or power analyzer on the secondary output (4mm red and black connectors)
7. Ensure that no calibration connectors are attached when measuring primary current. Always avoid to create a calibration short circuit, between + and — calibration connection.

When all connection are secured - connect mains power

It is mandatory to support the unit when rack mounted, either on the sides or backside.

Indications:

When mains is applied the left light diode on the front under the power symbol will light green.



For each sensor channel connected a green light diode will light on the front if the connection is correct and the sensor is operating within normal range.

Safety Instructions:

DO NOT TRY TO DISASSEMBLE THE UNIT.
Make sure that the unit is properly connected to earth ground.
Do not block the ventilation openings on the side panels.
If the fan does not operate properly contact Danisense for repair.
If the “POWER” green diode is not operating when mains is applied, disconnect power and contact Danisense for further instruction.

CE Statement:

This product has been tested and found to comply with the following standards.

Electrical safety:	EN 61010-1 2010
Electromagnetic Compatibility:	EN 61326-1 2006

Declaration of Conformity

Danisense A/S

Malervej 10

DK-2630 Taastrup

Denmark

Declares that under our sole responsibility the products listed in Appendix A are in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:

Directive 2014/30/EU

Directive 2014/35/EU

And that the following harmonized standards have been applied

EN 61010-1 (Third Edition):2010, EN 61010-1:2010

EN 61010-2-030:2010

EN 61326-1:2013

All DANISENSE products are manufactured in accordance with RoHS directive 2011/65/EU. Annex II of the RoHS directive was amended by directive 2015/863 in force since 2015, expanding the list of 6 restricted substances (Lead, Hexavalent Chromium, PBB, PBDE and Cadmium)

Danisense follows the provision in EN 63000:2018

Appendix A describes the products covered by this Declaration of Conformity.

Place		Date
Taastrup, Denmark	Henrik Elbæk	2022-03-15