A programmable contact free flux gate based current measurement sensor – up to 640A DC

DQ640ID-B is a current transducer targeting stable powe supplies and other areas, where it is important to have the programming flexibility.

Features

- Closed loop compensated current transducer
- Zero flux technology for extreme accuracy
- Industry standard DSUB 9 pin connection
- Green diode for normal operation indication
- Aluminum body for shielding against EMI

Applications:

- Stable power supplies
- MRI gradient amplifiers
- Reference transducer for calibration purposes

Specification highlights

- Linearity error 3uA
- Maximum offset is 10uA
- Operating temperature range 0°C to 55°C
- Turns ratio from 1:40 to 1:640, step 20
- Maximum compensation current 1A
- Maximum measurement resistor 1Ω
- 100-turn test winding (100mA max)
- Aperture size 28.1mm

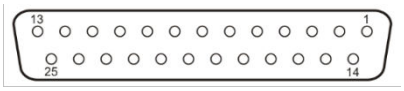
DC Specifications at Ta=25°C, Supply voltage ± 15V

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary Current	Ip	A	-640		640	
Secondary Current	Is	mA	-1000		1000	
Measuring resistance		Ω	0		1	
Supply voltage		V	±14.25		±15.75	
Linearity error	ƐLin	uA	-3		3	
Offset current	IOffset	uA	-10		+10	Including earth field. Measured on secondary current
Turns Ratio	Turns		1:40	Progr	1:640	Step 20
Noise 0-100Hz 0-1kHz 0-10kHz 0-100kHz	Noise	uA rms			 0.01 0.1 1.0 3.0	Measured on secondary current
Primary current Overload		kA			4.5	Maximum pulse length 100ms
Positive supply current	Ips	mA		98	105	Add Is (if Is is positive)
Positive supply current	Ins	mA		89	96	Add Is (if Is is negative)
Re-injected noise onto primary busbar	Un	uV rms			5	
Zero Flux Frequency	kHz			31.25		
Stability						
Offset stability over time		uA/Year			0.4	Measured on secondary current
Offset change with external magnetic field vertical		uA/mT		0.6	2.4	Magnetic field perpendicular to busbar
Offset change with external magnetic field horizontal		uA/mT		2.4	6	
Offset change with power supply voltage changes voltage		uA/V		0.012	0.12	
Offset change with difference between positive and negative power supply voltage (absolute)		uA/V		0.036	0.12	

Specifications are given for 1:640 configuration.
All ppm figures are related to 1A nominal current output

Configuration information:

Programing Plug Conections



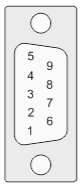
Trim+	12	11	10	9	8	7	6	5	4	3	2	1
Trim-	24	23	22	21	20	19	18	17	16	15	14	

Programing Table: Short connections at each "CONx" to set output ratio.

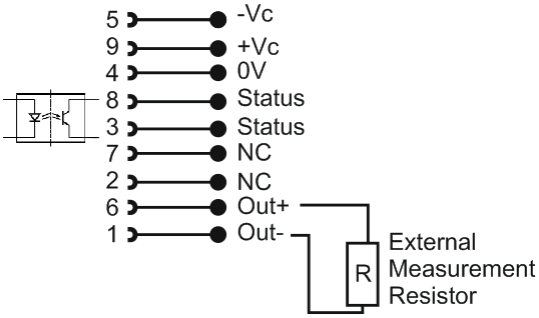
RATIO	CON1	CON2	CON3	CON4	CON5	CON6	CON7	CON8	CON9	CON10	CON11
1:640	1 - 14	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:620	1 - 14	2 - 3	4 - 5	6 - 7	8 - 9		10 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:600	1 - 14	2 - 3	4 - 5	6 - 7	8 - 9	10 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:580	1 - 14	2 - 3	4 - 5	6 - 7	8 - 10		9 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:560	1 - 14	2 - 3	4 - 5	6 - 7	8 - 10	9 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:540	1 - 14	2 - 3	4 - 5	6 - 8	7 - 9		10 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:520	1 - 14	2 - 3	4 - 5	6 - 8	7 - 9	10 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:500	1 - 14	2 - 3	4 - 5	6 - 8	7 - 10		9 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:480	1 - 14	2 - 3	4 - 5	6 - 8	7 - 10	9 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:460	1 - 14	2 - 3	4 - 6	5 - 7	8 - 9		10 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:440	1 - 14	2 - 3	4 - 6	5 - 7	8 - 9	10 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:420	1 - 14	2 - 3	4 - 6	5 - 7	8 - 10		9 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:400	1 - 14	2 - 3	4 - 6	5 - 7	8 - 10	9 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:380	1 - 14	2 - 3	4 - 6	5 - 8	7 - 9		10 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:360	1 - 14	2 - 3	4 - 6	5 - 8	7 - 9	10 - 12	11 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:340	1 - 14	2 - 3	4 - 6	5 - 8	7 - 10		9 - 23	15 - 16	17 - 18		19 - 22
1:320	1 - 14	2 - 3	4 - 6	5 - 8	7 - 10	9 - 12	11 - 23	15 - 16	17 - 18		19 - 22
1:300	1 - 14	2 - 4	3 - 5	6 - 7	8 - 9		10 - 23	15 - 16	17 - 20		21 - 22
1:280	1 - 14	2 - 4	3 - 5	6 - 7	8 - 9	10 - 12	11 - 23	15 - 16			17 - 22
1:260	1 - 14	2 - 4	3 - 5	6 - 7	8 - 10		9 - 23	15 - 16			17 - 22
1:240	1 - 14	2 - 4	3 - 5	6 - 7	8 - 10	9 - 12	11 - 23	15 - 16			17 - 22
1:220	1 - 14	2 - 4	3 - 5	6 - 8	7 - 9		10 - 23	15 - 18	19 - 20		21 - 22
1:200	1 - 14	2 - 4	3 - 5	6 - 8	7 - 9	10 - 12	11 - 23	15 - 18	19 - 20		21 - 22
1:180	1 - 14	2 - 4	3 - 5	6 - 8	7 - 10		9 - 23	15 - 18	19 - 20		21 - 22
1:160	1 - 14	2 - 4	3 - 5	6 - 8	7 - 10	9 - 12	11 - 23	15 - 18	19 - 20		21 - 22
1:140	1 - 14	2 - 4	3 - 6	5 - 7	8 - 9		10 - 23	15 - 18	19 - 20		21 - 22
1:120	1 - 14	2 - 4	3 - 6	5 - 7	8 - 9	10 - 12	11 - 23	15 - 18	19 - 20		21 - 22
1:100	1 - 14	2 - 4	3 - 6	5 - 7	8 - 10		9 - 23	15 - 18			19 - 22
1:80	1 - 14	2 - 4	3 - 6	5 - 7	8 - 10	9 - 12	11 - 23	15 - 18			19 - 22
1:60	1 - 14	2 - 4	3 - 6	5 - 8	7 - 9		10 - 23	15 - 20			21 - 22
1:40	1 - 14	2 - 4	3 - 6	5 - 8	7 - 9	10 - 12	11 - 23	15 - 20			21 - 22

Connection diagram

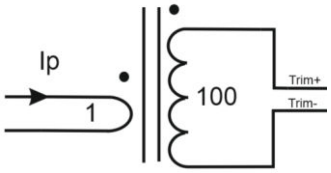
Standard DSUB-9 current output



When sensor is operating in normal condition the status pins are shorted. Maximum current flow 10mA from pin 8 to pin 3.



Calibration winding in DSUB-25



Absolute maximum ratings

Parameter	Unit	Min	Typ	Max	Comment
Primary	kA			4.5	* Maximum 100ms
Power supply	V			±16.5	
Current in test winding	mA			100mA	x 100 turns = 10A

Environment and mechanical characteristics

Parameter	Unit	Min	Typ	Max	Comment
Ambient operating temperature	°C	0		55	
Storage temperature	°C	0		55	
Mass	kg		0.6		
Standards	EN 61326 EMC EN 61010 Safety				

Isolation and safety characteristics

Parameter	Unit	Min
Rated isolation voltage rms, reinforced isolation IEC 61010-1 standard and with following conditions - Overvoltage category II - Pollution degree 2	V	300
Rms voltage for AC isolation test, 50/60 Hz, 1 min - Between primary and (secondary and shield) - Between secondary and shield	kV	5.7 0.2
Impulse withstand voltage	kV	10.4
Creepage distance / Clearance	mm	10 / 9
Comparative Tracking Index	CTI	600

Advanced Sensor Protection Circuits “ASPC”

Developed to protect your sensor from fault conditions typically harmful to flux-gate sensors. Protection against damage to the electronics in the following situations.

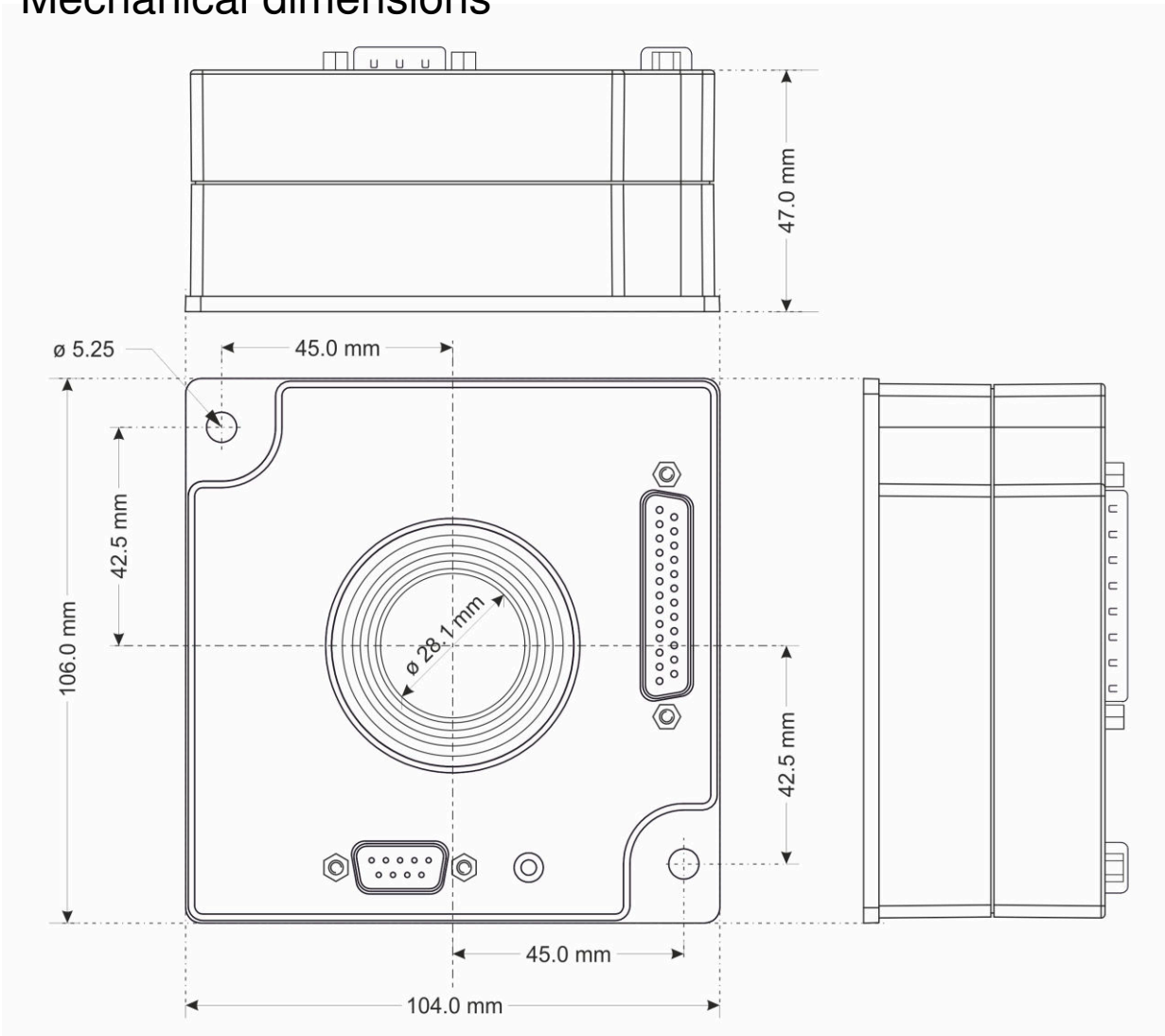
1. Unit is un-powered and secondary circuit is open*
   Both DC and AC primary current can be applied up to 100% of nominal current.
2. Unit is un-powered and secondary circuit is closed*
   Both DC and AC primary current can be applied up to 100% of nominal current.
3. Unit is powered and secondary circuit is open*
   Both DC and AC primary current can be applied up to 100% of nominal current.
4. Unit is powered and secondary circuit is interrupted*
   Both DC and AC primary current can be applied up to 100% of nominal current.

*Notice that the sensor core will be magnetized in all four cases, leading to a small change in output offset current (less than 10ppm)

Package content

- 1 x Sensor
- 1 x Programming plug to customer specification (1:640 by default)
- 1 x (Sensor specific test report + Programming sheet + CE certificate of conformance)

Mechanical dimensions



Options and ordering information

Product Description	Part Name	Part Number
DQ640ID-B programmable transducer from 40A to 640A, step 20A	DQ640ID-BXXX	1211100001

XXX identifies the programming of the one free plug which is included in the product.
Ex. If 1:320 is wanted then order DQ640ID-B320

Declaration of Conformity

Danisense A/S

Malervej 10

DK-2630 Taastrup

Denmark

Declares that under our sole responsibility that this product is 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/A1:2019

EN 61010-2-030:2021/A11:2021

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

Place

Taastrup, Denmark

Date

2022-03-10