

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

DQ640ID-B is a current transducer targeting stable power 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	I _p	A	-640		640	
Secondary Current	I _s	mA	-1000		1000	
Measuring resistance		Ω	0		1	
Supply voltage		V	±14.25		±15.75	
Linearity error	ε _{Lin}	uA	-3		3	
Offset current	I _{Offset}	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	I _{ps}	mA		98	105	Add I _s (if I _s is positive)
Positive supply current	I _{ns}	mA		89	96	Add I _s (if I _s is negative)
Re-injected noise onto primary busbar	U _n	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

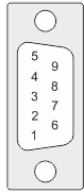
Configuration information:

Programming Plug Connections												
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	

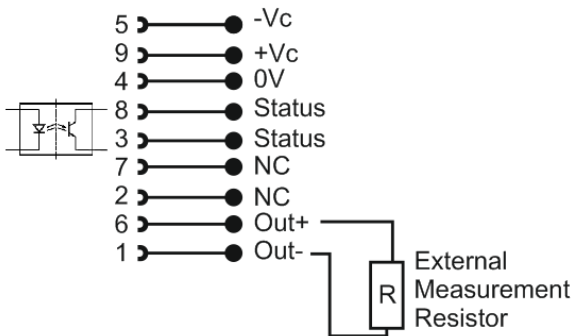
Programming Table: Short connections at each "CONx" to set output ratio.											
RATIO	CON1	CON2	CON3	CON4	CON5	CON6	CON7	CON8	CON9	CON10	CON11
1:640	1 - 14	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 23	15 - 16	17 - 18	19 - 20	21 - 22
1:620	1 - 14	2 - 3	4 - 5	6 - 7	8 - 9		10 - 23	15 - 16	17 - 18	19 - 20	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

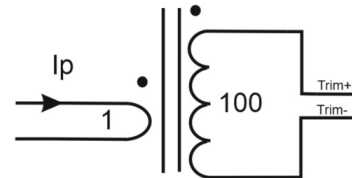
Standard DSUB-9 current output



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.

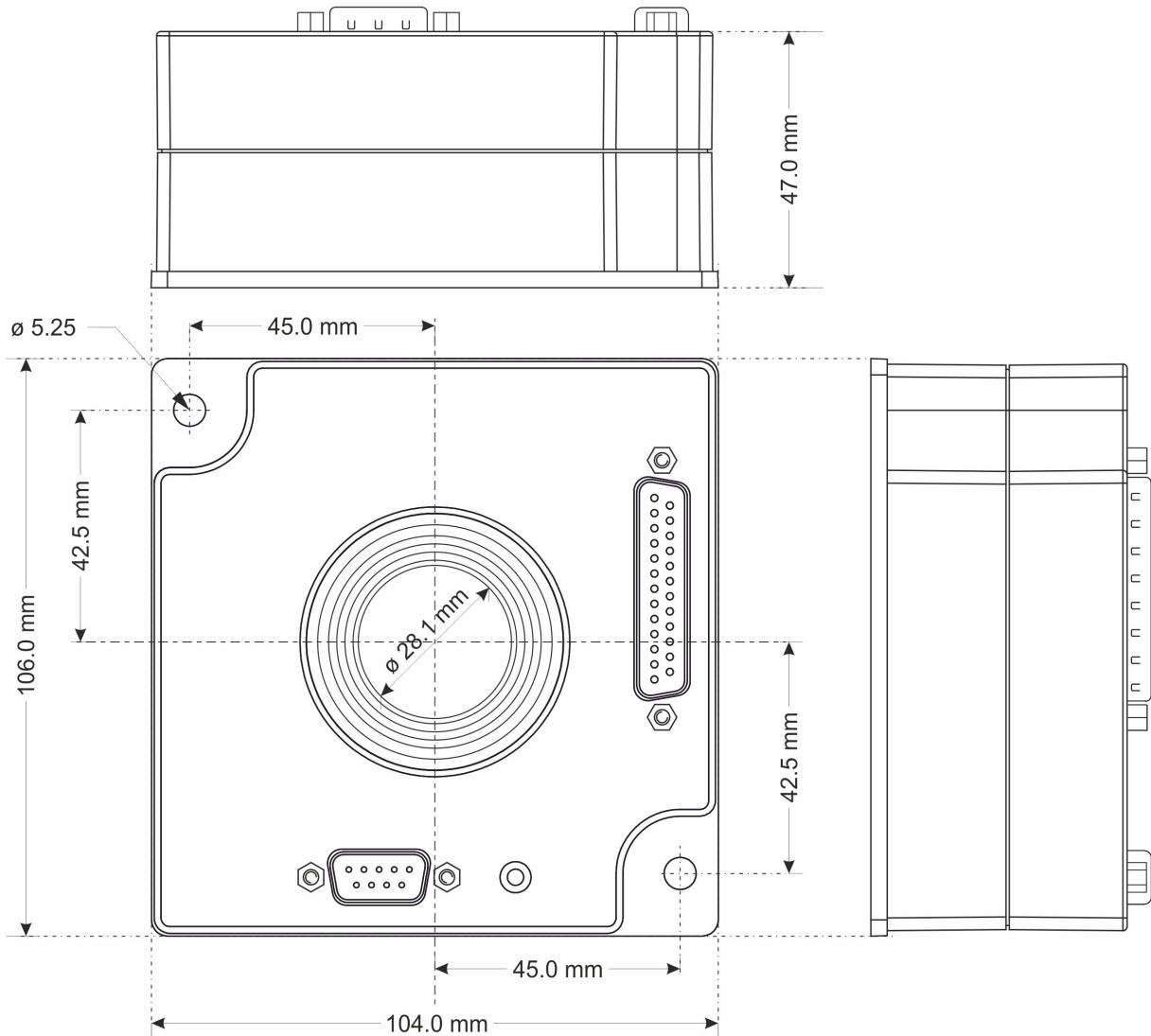
1. Unit is un-powered and secondary circuit is open*
Both DC and AC primary current can be applied up to 100% of nominal current.
2. Unit is un-powered and secondary circuit is closed*
Both DC and AC primary current can be applied up to 100% of nominal current.
3. Unit is powered and secondary circuit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

Taastrup, Denmark

Henrik Elbæk

Date

2022-03-10