Model: CAT2

Versatile DC or AC Transmitter

(Can Be Interfaced With Any Hoffer Flow Sensor)

USER'S MANUAL

HP-311
December 2020

HOFFER Flow Controls
Perfecting Measurement™

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NOTICE

HOFFER FLOW CONTROLS, INC. makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

This manual has been provided as an aid in installing, connecting, calibrating, operating, and servicing this unit. Every precaution for accuracy has been taken in the preparation of this manual; however, HOFFER FLOW CONTROLS, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that may result from the use of the products in accordance with information contained in the manual.
HOFFER FLOW CONTROLS' policy is to provide a user manual for each item supplied. Therefore, all applicable user manuals should be examined before attempting to install or otherwise connect a number of related subsystems.

During installation, care must be taken to select the correct interconnecting wiring drawing. The choice of an incorrect connection drawing may result in damage to the system and/or one of the components.

Please review the complete model number of each item to be connected and locate the appropriate manual(s) and/or drawing(s). Identify all model numbers exactly before making any connections. A number of options and accessories may be added to the main instrument, which are not shown on the basic user wiring. Consult the appropriate option or accessory user manual before connecting it to the system. In many cases, a system wiring drawing is available and may be requested from HOFFER FLOW CONTROLS.

HOFFER FLOW CONTROLS' policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering. The information contained in this document is subject to change without notice.

Return Requests / Inquiries

Direct all warranty and repair requests/inquiries to the Hoffer Flow Controls Customer Service Department, telephone number (252) 331-1997 or 1-800-628-4584. BEFORE RETURNING ANY PRODUCT(S) TO HOFFER FLOW CONTROLS, PURCHASER MUST OBTAIN A RETURNED MATERIAL AUTHORIZATION (RMA) NUMBER FROM HOFFER FLOW CONTROLS' CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned RMA number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting HOFFER FLOW CONTROLS:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS OR CALIBRATIONS, consult HOFFER FLOW CONTROLS for current repair/ calibration charges. Have the following information available BEFORE contacting HOFFER FLOW CONTROLS:

1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of the product and
3. Repair instructions and/or specific problems relative to the product.

Limited Warranty

HOFFER FLOW CONTROLS, INC. ("HFC") warrants HFC's products ("goods") described in the specifications incorporated in this manual to be free from defects in material and workmanship under normal use and service, but only if such goods have been properly selected for the service intended, properly installed and properly operated and maintained. This warranty shall extend for a period of one (1) year from the date of delivery to the original purchaser (or eighteen (18) months if the delivery to the original purchaser occurred outside the continental United States). This warranty is extended only to the original purchaser ("Purchaser"). *Purchaser's sole and exclusive remedy is the repair and/or replacement of nonconforming goods as provided in the following paragraphs.*

In the event Purchaser believes the goods are defective, the goods must be returned to HFC, transportation prepaid by Purchaser, within twelve (12) months after delivery of goods (or eighteen (18) months for goods delivered outside he continental United States) for inspection by HFC. If HFC's inspection determines that the workmanship or materials are defective, the goods will be either repaired or replaced, at HFC's sole determination, free of additional charge, and the goods will be returned, transportation paid by HFC, using he lowest cost transportation available.

Prior to returning the goods to HFC, Purchaser must obtain a Returned Material Authorization (RMA) Number from HFC's Customer Service Department within 30 days after discovery of a purported breach of warranty, but no later than the warranty period; otherwise, such claims shall be deemed waived. See the Return Requests/Inquiries Section of this manual.

If HFC's inspection reveals the goods are free of defects in material and workmanship or such inspection reveals the goods were improperly used, improperly installed, and/or improperly selected for service intended, HFC will notify the purchaser in writing and will deliver the goods back to Purchaser upon (i) receipt of Purchaser's written instructions and (ii) the cost of transportation. If Purchaser does not respond within thirty (30) days after notice from HFC, the goods will be disposed of in HFC's discretion.

HFC does not warrant these goods to meet the requirements of any safety code of any state, municipality, or other jurisdiction, and Purchaser assumes all risk and liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

This warranty shall not apply to any HFC goods or parts thereof, which have been repaired outside HFC's factory or altered in any way, or have been subject to misuse, negligence, or accident, or have not been operated in accordance with HFC's printed instructions or have been operated under conditions more severe than, or otherwise exceeding, those set forth in the specifications for such goods.

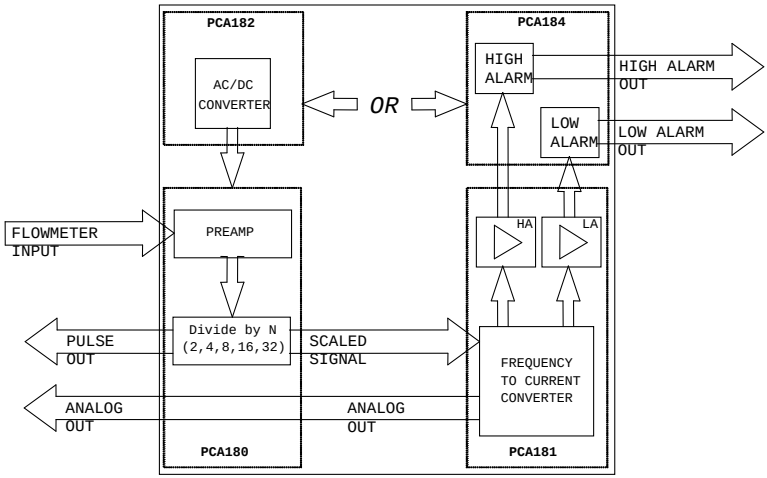
THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HFC SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE RESULTING, DIRECTLY OR INDIRECTLY, FROM THE USE OR LOSS OF USE OF THE GOODS. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, THIS EXCLUSION FROM LIABILITY EMBRACES THE PURCHASER'S EXPENSES FOR DOWNTIME OR FOR MAKING UP DOWNTIME, DAMAGES FOR WHICH THE PURCHASER MAY BE LIABLE TO OTHER PERSONS, DAMAGES TO PROPERTY, AND INJURY TO OR DEATH OF ANY PERSONS. HFC NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR USE OF HFC'S GOODS, AND THERE ARE NO ORAL AGREEMENTS OR WARRANTIES COLLATERAL TO OR AFFECTING THE AGREEMENT. *PURCHASER'S SOLE AND EXCLUSIVE REMEDY IS THE REPAIR AND/OR REPLACEMENT OF NONCONFORMING GOODS AS PROVIDED IN THE PRECEDING PARAGRAPHS. HFC SHALL NOT BE LIABLE FOR ANY OTHER DAMAGES WHATSOEVER INCLUDING INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.*

CONTENTS

1. INTRODUCTION

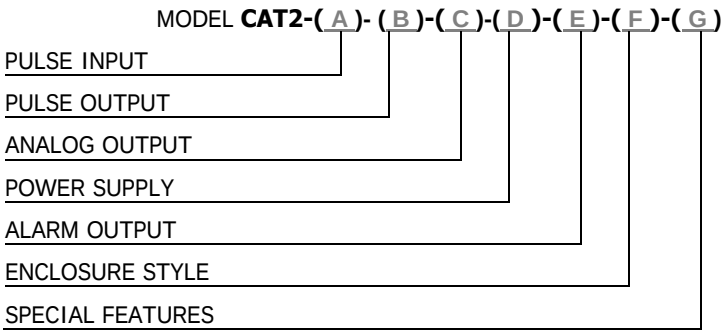
The CAT2 is a versatile DC or AC powered transmitter, which provides pulse output, analog output and High/Low flow alarm options. Up to 3 circuit boards may be installed to provide a variety of input/output options.

CAT2 Block Diagram



Many enclosure options are available including the standard extruded aluminum enclosure, an optional bracket for DIN rail mounting or direct flowmeter mounting using an optional NEMA 4X or EX enclosure.

1.1 Model Number Designation



PULSE INPUT

MODEL **CAT2-(** A **)-( )-( )-( )-( )-( )-( )**

OPTION **(A)**

(1) MAG COIL, PULSE, DRY CONTACT

(2) MC3P

(3) ISOLATED PULSE, RPM, RPR COILS

PULSE OUTPUT

MODEL **CAT2-( )-(** B **)-( )-( )-( )-( )-( )**

OPTION **(B)**

(1) 0-5V TTL / CMOS

(2) OPEN COLLECTOR

(3) OPEN COLLECTOR WITH PULL UP TO V+

(4) AC SQUARE WAVE

(5) 0-10V SQUARE WAVE

ANALOG OUTPUT

MODEL **CAT2-( )-( )-(** C **)-( )-( )-( )-( )**

OPTION **(C)**

(1) 4-20 MA

(3) 0-5 VDC

(4) 0-10 VDC

(5) 1-5 VDC

POWER SUPPLY

MODEL **CAT2-( )-( )-( )-(D)-( )-( )-( )**

OPTION **(D)**

(DC) 13-30 VDC

(AC) 100-240 VAC

NOTE: WHEN (AC) IS SELECTED, THE ALARM OPTION IS NOT AVAILABLE. USE REMOTE ACC39B POWER SUPPLY.

ALARM OUTPUT

MODEL **CAT2-( )-( )-( )-( )-(E)-( )-( )**

OPTION **(E)**

(1) HIGH / LOW OPEN COLLECTOR

(2) HIGH / LOW TTL / CMOS

(3) HIGH / LOW RELAY TWO SPDT, CONTACT RATED @ 2A 30V

(4) HIGH OPEN COLLECTOR

(5) HIGH TTL / CMOS

(6) HIGH RELAY ONE SPDT, CONTACT RATED @ 2A 30V

(7) LOW OPEN COLLECTOR

(8) LOW TTL / CMOS

(9) LOW RELAY ONE SPDT, CONTACT RATED @ 2A 30V

NOTE: WHEN ALARM OPTION IS SELECTED, (AC) POWER IS NOT AVAILABLE. USE REMOTE ACC39B POWER SUPPLY.

ENCLOSURE STYLE

MODEL **CAT2-( )-( )-( )-( )-( )-(F)-( )**

OPTIONS **(F)**

(1) GENERAL PURPOSE.
2.6"L X 2.6"H X 2.6"W MINIMUM MOUNTING SPACE.

(D) 2" LONG DIN RAIL MOUNT SINGLE UNIT.
UP TO 20 CAT2 UNITS CAN BE MOUNTED
ON A SINGLE RAIL. ADD 2" PER UNIT.

(E3) EXPLOSION-PROOF (ALL CONDUIT PORTS ARE ¾" FNPT)

(E3M) EXPLOSION-PROOF (CONDUIT PORTS D2 & D3 = M20 THR'D;

(E4)* EXPLOSION-PROOF - FOR USE WITH AC POWERED CAT ONLY
(NOT Ex d SYSTEM CERTIFIED)
***FOR Ex d CERTIFIED SYSTEM USE E6 OR E6M ENCLOSURE**

(E6) EXPLOSION-PROOF STAINLESS STEEL
(ALL CONDUIT PORTS ARE ¾"FNPT)

(E6M) EXPLOSION-PROOF STAINLESS STEEL **(M20 NOT AVAILABLE FOR CANADA)**

NOTE: FOR UL LISTED EXPLOSION-PROOF APPLICATIONS CONTACT FACTORY.

SPECIAL FEATURES

MODEL **CAT2-( )-( )-( )-( )-( )-( )-(G)**

OPTIONS **(G)**

(CE) MARK REQUIRED FOR EUROPE

(SP) ANY SPECIAL FEATURES THAT ARE NOT COVERED IN THE MODEL NUMBER, USE A WRITTEN DESCRIPTION OF THE –SP.

(CFX) 6.75" LONG RISER AND UNION FOR EXPLOSION-PROOF **SYSTEM CERTIFIED ENCLOSURES** MOUNTED ON TURBINE. USED WITH "X" RISER TURBINE OPTION AND (EXP) OR (EX) SPECIAL FEATURES OPTION UNDER FLOWMETERS AS FOLLOWS:
(EXP) FOR CANADIAN INSTALLATION OR
(EX) FOR NON-CANADIAN INSTALLATION.

NOTE: IF PROCESS TEMP IS < -40°C AND > 79°C, EX-PROOF ENCLOSURE MUST BE MOUNTED REMOTELY.

(C) REMOTED MOUNTED FOR EXPLOSION-PROOF **SYSTEM CERTIFIED ENCLOSURE. FOR USE WITH (C-EXP) OR (C-EX) SPECIAL FEATURES UNDER FLOWMETERS AS FOLLOWS:**
(EXP) FOR CANADIAN INSTALLATION OR
(EX) FOR NON-CANADIAN INSTALLATION.

NOTE: ***"X" RISER, CERTIFIED UNION, REDUCER AND ENCLOSURE (TO BE SPECIFIED) MOUNTED ON FLOWMETER.***

(X) NO SPECIAL FEATURES

STYLE E3, E3M, E6 AND E6M SYSTEM CERTIFIED RATINGS

- CSA/FM: CLASS I, DIV. 1, GR. BCD; CLASS II, DIV. 1, GR. EFG;
  CLASS III, TYPE 4X,
  CLASS 1 ZONE 1 AEx db IIB + H2 T6/T5 Gb,
  Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db; IP66
  CLASS I, ZONE 21 AEx tb T80°C/T86°C IIIC Db; IP 66

- ATEX/IECEx: II 2 G Ex db IIB + H2, T6/T5 Gb
  II 2 D Ex tb IIIC T80°C/T86°C Db; IP66
  T6: -40°C ≤ Ta ≤ 79°C; T5: -40°C ≤ Ta ≤ 85°C

NOTES:

1. **IF ENCLOSURE IS MOUNTED ON TURBINE FLOWMETER, RISER MUST BE SPECIFIED ON METER.**
2. **PULSE SCALING IS SUPPLIED AS A STANDARD. THE PULSE OUTPUT IS SCALED SO THAT THE MAX FLOW IS BETWEEN 75-150 HZ WHEN THE ANALOG OPTION IS SELECTED.**

2. SPECIFICATIONS

General Specifications

Input Signal Type:	Magnetic pick up, MCP pick up, Contact Closure, Pulse
Input frequency range:	0.2 Hz to 4 KHz
Signal level:	10 mV rms to 30 Vdc
Power supply:	13-30 Vdc (Reverse polarity protected) 100-240 Vac (Fuse rating 0.5A, 250 Vac
Analog Output:	4-20mA, 1-5V, 0-5V, 0-10V
Load resistance:	Max 550 Ohms at 24 Vdc
Accuracy:	+/- 0.1% of full scale @ 20° C
Temperature drift:	200ppm/deg C
Pulse output	0-5, 0-10V, Open Collector, AC square Internal pull-up resistor 2.7k Ohms Recommended load min. 50k Ohms
Pulse scaling	Divide by 2, 4, 8, 16, 32
Hi/Lo Alarm	Relay (2A, 30, Vdc), 0-5V, Open Collector (0.5A, 30V)
Operating temperature:	T5 and STD: $-40^{o} \leq Ta \leq 85^{o}$ C T6: $-40^{o} \leq Ta \leq 79^{o}$ C
Humidity:	0-90% Non-condensing
Enclosure:	Extruded aluminum DIN rail mount Explosion Proof
Regulatory:	CE compliant

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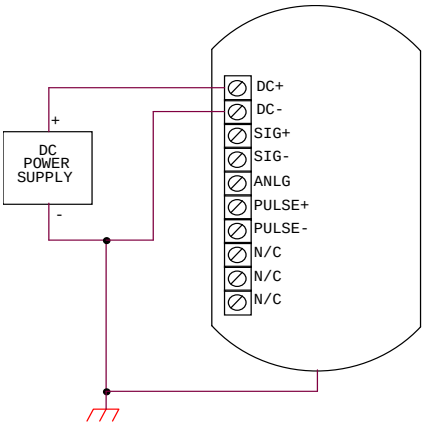
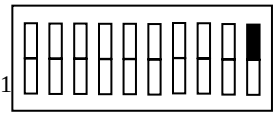
3. INSTALLATION

3.1 Power Supply

DC Power (13-30 VDC)

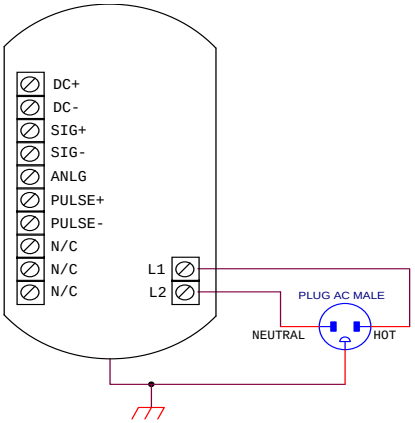


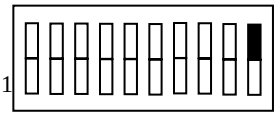


PCA180
SW2

AC Power (100-240 VAC)

AC power for CAT2 requires an optional circuit board, PCA182. The Alarm option (PCA184) is not available when the AC Power option is equipped.



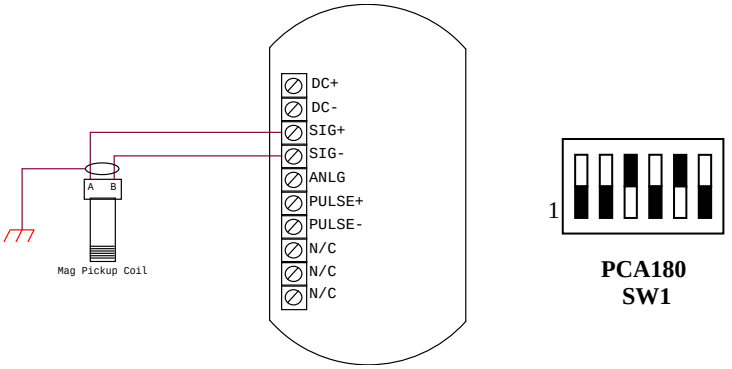


PCA180
SW2

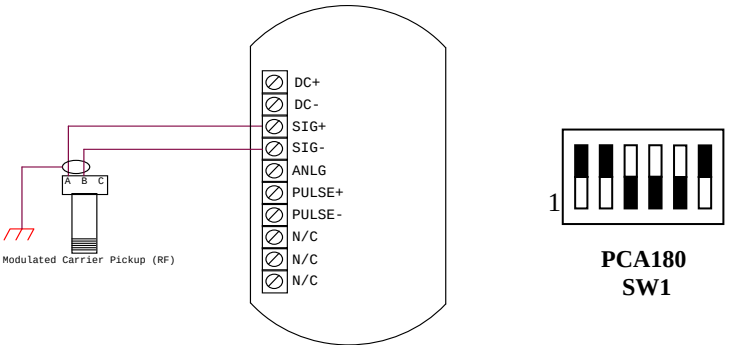
3.2 Flowmeter Input

The Preamp circuitry for conditioning the flow signal is located on PCA180. The following drawings illustrate typical connections and switch settings on PCA180 for various input signals.

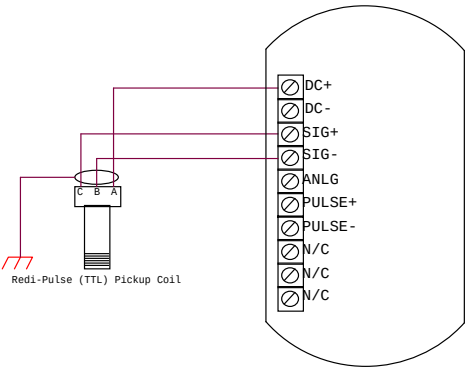
Magnetic Pickup Coil

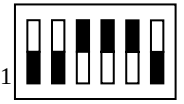


MCP/RF Coil



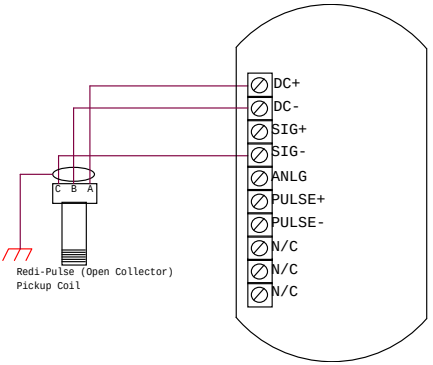
Redi-Pulse (TTL Pulse)

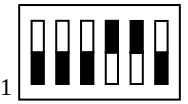




PCA180
SW1

Redi-Pulse (Open Collector)





PCA180
SW1

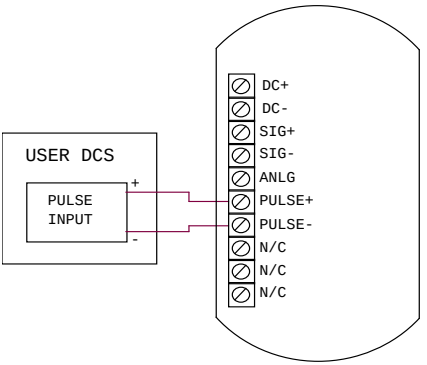
3.3 Pulse Output

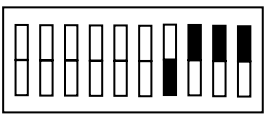
The pulse output circuitry for CAT2 is located on PCA180. The pulse output is scalable by a factor of 1, 2, 4, 8, 16 and 32 of the input frequency by selecting the proper switch on SW2. Scaling of the pulse output may be limited if an analog output is used in conjunction with the pulse output. The following drawings illustrate typical connections and switch settings for various pulse output options.

Pulse Scaling

Scaling Factor (Divide by N of Input)	**Switch Setting** (SW2, PCA180)
1	SW2-1 ON
2	SW2-2 ON
4	SW2-3 ON
8	SW2-4 ON
16	SW2-5 ON
32	SW2-6 ON

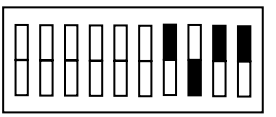
TTL(0-5V), 0-10V, High Level (DC In), AC Square





PCA180
SW2

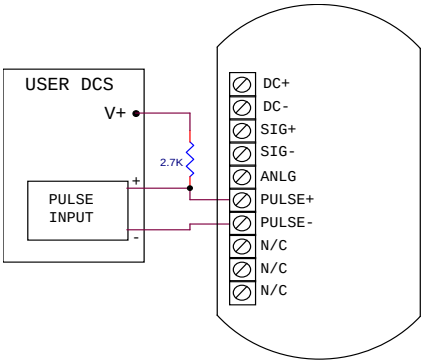
TTL(0-5V), 0-10V, AC Square

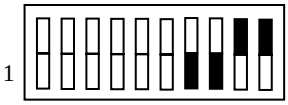


PCA180
SW2

High Level Pulse, AC Square

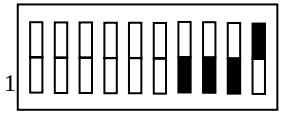
Open Collector, Isolated Pulse





PCA180
SW2

Open Collector



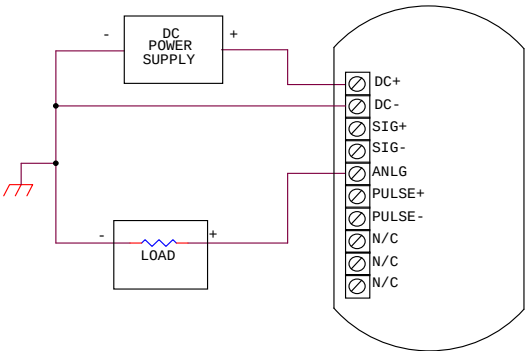
PCA180
SW2

Isolated Pulse

3.4 Analog Output

CAT2 provides an Analog Output option that will output an analog current or voltage that is proportional to the flow rate. The Analog Output for CAT2 requires an optional circuit board, PCA181.

Analog Output



The input frequency is scaled using SW2 on PCA180 so that the preamp output frequency at max flow is between 75 and 150 Hz. For example, if the max flow input signal is 1,000 Hz, SW2-4 should be in the ON position to divide the preamp signal by 8 so that the max frequency out of the preamp is 125 Hz. Refer to the table in the previous section for the appropriate switch settings. If the Pulse Output option is used in conjunction with the Analog Output, the Pulse Output frequency will be limited by this scaling factor.

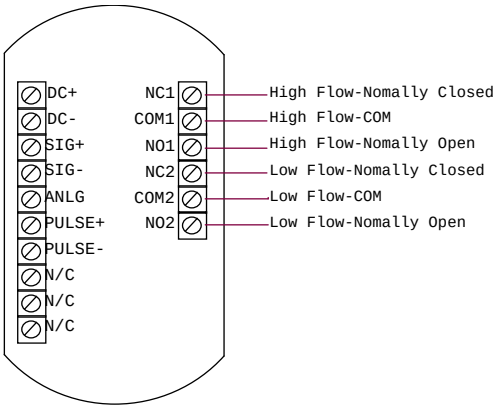
There are 3 potentiometers on PCA181 for ZERO and SPAN adjustment. The ZERO pot adjusts the no flow output, while COURSE SPAN and FINE SPAN adjusts the max flow output. All pots are labeled accordingly on the circuit board and may be accessed by removing the top plate from CAT2. The 0-20mA, 0-5V and 0-10V options require no ZERO adjustment. Contact the factory for detailed calibration instructions before making any adjustments.

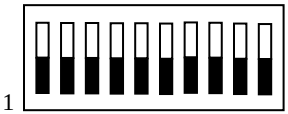
Analog Output Response Time: The analog output response time to reach steady state due to a change in the flow rate is approximately two (2) seconds.

3.5 Alarm Outputs

CAT2 provides an optional High/Low Flow Alarm feature. The Alarms require an optional circuit board, PCA184. The Alarm option is not available when the AC Power option is equipped. The following drawings illustrate typical connections and switch settings for various alarm output options.

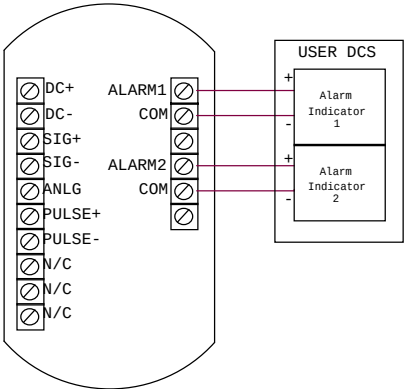
Hi/Lo Alarm Relay

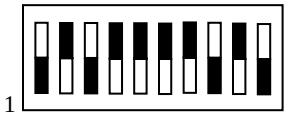




PCA184
SW1

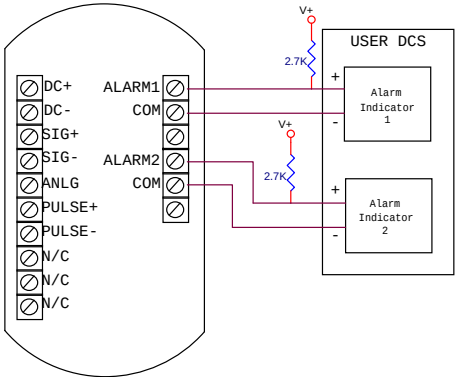
Hi/Lo Alarm TTL(0-5V)

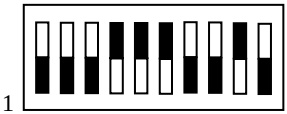




PCA184
SW1

Hi/Lo Alarm Open Collector





PCA184
SW1

3.6 Wiring Note

When installing CAT2, it is a good practice to use shielded cables for all input and output signals. The shield should be connected to the earth ground lug on the CAT2. The shield on the opposite end of the cable should be left open. Connections are made to the CAT2 terminal blocks using wire gauges 16 to 28 AWG and 12 to 26 AWG (AC Power), tightening Torque 0.22 to 0.25Nm.

This wiring practice is mandatory in order to comply with the requirements for Electromagnetic Compatibility, as per EMC-Directive 2014/30/EU of the Council of European Community.

APPENDIX A – Declaration of Conformity

HOFFER FLOW CONTROLS, INC.
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www.hofferflow.com • Email: info@hofferflow.com

EU Declaration of Conformity – CAT Series Transmitters

Manufacturer: Hoffer Flow Controls Inc, 107 Kitty Hawk Ln, Elizabeth City, NC 27909

Equipment: Flame Proof Transmitters

Designation/Model: CAT1-X-X-X-X, CAT2-X-X-X-X-X-X-X and CAT3-X-X-X-X-X-X-X
NOTE: "X" in Model number may be any combination of numbers and characters representing specific options.

Marking: With Aluminum Explosion Proof Enclosure

Class I, Division 1, Groups BCD; Class II, Division 1, Groups E,F,G; Class III; Type 4X;
Ex d IIB+H_2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db; IP66;
Class I, Zone 1, AEx db IIB+H_2 T6/T5; Gb; Class I, Zone 21, AEx tb T80°C/T86°C IIIC Db; IP66:

II 2 G Ex db IIB+H2 T6/T5 Gb
II 2 D Ex tb IIIC T80°C/T86°C Db IP66
T6 = -40°C to +79°C; T5 = -40°C to +85°C

Seal within 50mm of enclosure.

Marking: With Stainless Steel Enclosure

Class I, Division 1, Groups BCD; Class II, Division 1, Groups E,F,G; Class III; Type 4X;
Ex d IIB+H_2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db; IP66;
Class I, Zone 1, AEx db IIB+H_2 T6/T5; Gb; Class I, Zone 21, AEx tb T80°C/T86°C IIIC Db; IP66:

II 2 G Ex db IIB+H2 T5/T6 Gb
II 2 D Ex tb IIIC T86°C Db IP66
T6 = -40°C to +79°C; T5 = -40°C to +85°C

Seal within 18" of enclosure.

HOFFER FLOW CONTROLS, INC.
Perfecting Measurement™
107 Kitty Hawk Lane • P.O. Box 2145 • Elizabeth City, North Carolina 27906-2145
1-800-628-4584 • (252) 331-1997 • FAX (252) 331-2886
www.hofferflow.com • Email: info@hofferflow.com

This declaration of conformity is issued under the sole responsibility of the manufacturer. The object of the declaration is in conformity with the relevant Union harmonisation Legislation. We hereby declare that the product, which is subject of this declaration, is in conformity with the following standards:

ATEX	ATEX Directive 2014/34/EU: Equipment and protective systems intended for use in potentially explosive atmospheres. Applicable Standards - EN 60079-0:2017; EN 60079-1:2014 and EN 60079-31:2014	EU-Type Examination Certificate: Sira 16 ATEX 1086 X
CSA	Applicable CSA Requirements: CSA C22.2 No. 0-10, CSA C22.2 no. 142-M1987, CSA C22.2 No. 25-1966 (R2014), CSA C22.2 No. 30-M1986 (R2012), UL 508, CAN-CSA 60079-0:11, 60079-1:11 60079-39:12, FM 3600, FM 3615, FM 3616, UL 60079-0:2013, 60079-1: 2015 and 60079-31:2015	CSA-Type Examination Certificate:
IECEx	IEC Certification for Explosive Atmospheres. Applicable Standards IEC 60079-0:2017 IEC 60079-1:2014 and IEC 60079-31:2013	IECEx CSA 16.0016X

EU-Directive 2014/34/EU Annex IV/IECEx Certificate issued by:

The Certification Body for Explosion Protection
of TÜV Rheinland Industrie Service GmbH

Certificate No.: 01 220 1609028 Notified Body Number: 0035

EU type examination certificate issued by: Certificate: Sira 16 ATEX 1086 X CSA Group Netherlands B.V. Utrechseweg 310 6812 AR Arnhem Netherlands	CSA-Type Examination Certification issued by: CSA Group Testing & Certification Inc. Edmonton, AB, Canada T6N 1E6

John DeFeo

_____Date: 12/11/2020
John DeFeo, Compliance Engineer
Hoffer Flow Controls, Inc.

APPENDIX B – Installation and Conditions for Safe Use Drawings for Certified Systems

DWG NO.	CAT-906	SH 1	REV C

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APP
	A	REVISED PER REDLINED DRAWING	140908	JD
	B	REVISED PER REDLINED DRAWING	141023	JD
	C	PER REVISED ECP 500-115	160414	JD

CSA INSTALLATION INSTRUCTIONS

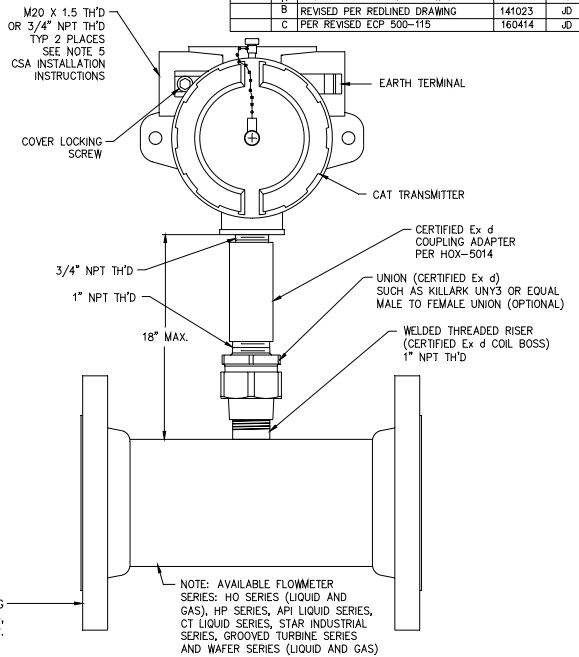
1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES, VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS; DIVISIONS XP: CLASS I, DIVISION 1, GROUPS B,C,D; CLASS II, DIVISION 1, GROUPS E,F,G; CLASS III; TYPE 4X ZONES FP CAN; Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db; IP66. ZONES FP USA; CLASS I, ZONE 1 AEx db IIB+H2 T6/T5; Gb; CLASS I, ZONE 21, AEx tb T80°C/T86°C IIIC Db; IP66.
2. THE EQUIPMENT IS CERTIFIED FOR USE WITH AMBIENT TEMPERATURE RANGE OF −40°C TO 79°C FOR T6 AND −40°C TO 85°C FOR T5.
3. WHEN PROCESS TEMPERATURES ARE < −40°C AND > 85°C EXPLOSION PROOF ENCLOSURE WITH CAT TRANSMITTER WILL BE REMOTELY MOUNTED AWAY FROM FLOWMETER.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE WITH THE APPLICABLE CODE OF PRACTICE, NAMELY THE NATIONAL ELECTRIC CODE AND THE CANADIAN ELECTRICAL CODE.
5. INSTRUMENT ENCLOSURE IS FURNISHED WITH M20 OR 3/4" NPT CONDUIT ENTRIES. M20 THREAD NOT ALLOWED FOR USE IN CANADA.
6. TIGHTEN THE COVER LOCKING SCREW TO PREVENT THE COVER FROM LOOSENING UNDER VIBRATION.
7. USE WIRE RATED TOR 90°C OR HIGHER.

CONDITIONS FOR SAFE USE: CSA

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS OR VAPORS.
2. SELECT AN INSTALLATION LOCATION SO THAT THE ENCLOSURE WILL NOT BE SUBJECTED TO IMPACT BY HEAVY OBJECTS.
3. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED. PLUGS MUST BE CSA CERTIFIED FLAMEPROOF PLUGS.
4. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED FLAMEPROOF, SUITABLE FOR THE CONDITIONS OF USE AND CORRECTLY INSTALLED.
5. FOR CLASS 1, DIV 1 INSTALLATIONS, CONDUIT SEAL IS REQUIRED WITHIN 50mm OF ENCLOSURE.

MARKING

CL.I, DIV.1, GR.B,C,D
CL.II, DIV.1, GR.E,F,G; CL.III; TYPE 4X
CL.I, ZONE 1 AEx db IIB+H2 T6/T5; Gb
Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db IP66
CLASS I, ZONE 21 AEx tb T80°C/T86°C IIIC Db; IP66
A SEAL SHALL BE INSTALLED WITHIN 50mm OF ENCL.
T6: −40° < To < 79°; T5: < −40° < To < 85°
USE WIRE RATED 90°C OR HIGHER



		MATERIAL	DRAWN BALLANCE	DATE 121114
			CHECK J.DEFEO	121114
			PROJ ENG J.DEFEO	121114
		FINISH		
NEXT ASSY	USED ON			
APPLICATION				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS:

2 PLACE DECIMALS	± .01
3 PLACE DECIMALS	± .005
FRACTIONAL	± 1/64
ANGULAR	± 1/2°

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE: INSTALLATION DWG, CSA FLAMEPROOF CERTIFIED XD-180 CAT TRANSMITTER MOUNTED

SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-906	C
SCALE	NONE	SHEET	1 OF 1

DWG NO.	CAT-907	SH 1	REV D

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APP
	A	REVISED PER REDLINED DWG, ZN 1C ADDED -Ex TOKILLARK P/N	130613	JD
	B	REVISED PER REDLINED DRAWING	140908	JD
	C	REVISED PER REDLINED DRAWING	141023	JD
	D	PER REVISED ECP 500-115	160415	JD

ATEX/IECEx INSTALLATION INSTRUCTIONS

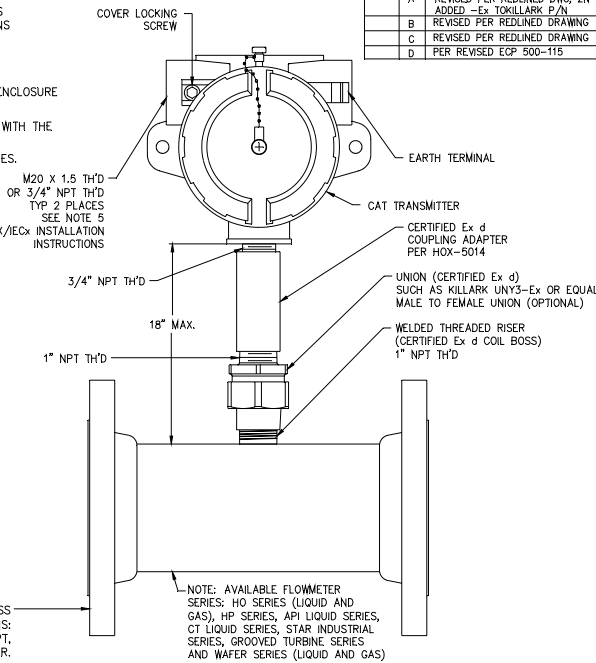
1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS Ex db IIB+H2 T6/T5 Gb; Ex tb IIIC T80°C/T86°C Db; IP66.
2. THE EQUIPMENT IS CERTIFIED FOR USE WITH AMBIENT TEMPERATURE RANGE OF −40°C TO 79°C FOR T6 AND −40°C TO 85°C FOR T5.
3. WHEN PROCESS TEMPERATURES ARE < −40°C AND > 85°C EXPLOSION PROOF ENCLOSURE WITH CAT TRANSMITTER WILL BE REMOTELY MOUNTED AWAY FROM FLOWMETER.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE WITH THE APPLICABLE CODE OF PRACTICE, NAMELY IEC 60079-14.
5. INSTRUMENT ENCLOSURE IS FURNISHED WITH M20 OR 3/4" NPT CONDUIT ENTRIES. M20 THREAD NOT ALLOWED FOR USE IN CANADA.
6. TIGHTEN THE COVER LOCKING SCREW TO PREVENT THE COVER FROM LOOSENING UNDER VIBRATION.
7. USE WIRED RATED FOR 90°C OR HIGHER.

CONDITIONS FOR SAFE USE: ATEX/IECEx

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS OR VAPORS.
2. SELECT AN INSTALLATION LOCATION SO THAT THE ENCLOSURE WILL NOT BE SUBJECTED TO IMPACT BY HEAVY OBJECTS.
3. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED. PLUGS MUST BE ATEX/IECEx CERTIFIED Ex d PLUGS.
4. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED Ex d, SUITABLE FOR THE CONDITIONS OF USE AND CORRECTLY INSTALLED.
5. CONDUIT ENTRIES MUST BE SEALED AT THE ENCLOSURE WALL.

MARKING

II 2 G Ex db IIB+H2 T6/T5 Gb
II 2 D Ex tb IIIC T80°C/T86°C Db; IP66
T6: −40°C < Ta < 79°C
T5: −40°C < Ta < 85°C



		MATERIAL	DRAWN BALLANCE	DATE 121114
			CHECK J.DEFEO	121114
			PROJ ENG J.DEFEO	121114
		FINISH		
NEXT ASSY	USED ON			
APPLICATION		CONFIDENTIAL PROPERTY OF HOFFER FLOW CONTROLS, INC. (HFC) NOT TO BE DISCLOSED TO OTHERS, REPRODUCED, OR USED FOR ANY OTHER PURPOSE, EXCEPT AS AUTHORIZED IN WRITING BY HFC. MUST BE RETURNED ON DEMAND, ON COMPLETION OF ORDER OR OTHER PURPOSE FOR WHICH LENT.	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS: 2 PLACE DECIMALS ± .01 3 PLACE DECIMALS ± .005 FRACTIONAL ± 1/64 ANGULAR ± 1/2°	

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE: INSTALLATION DWG, ATEX/IECEx Ex d CERTIFIED XD-I80 - CAT TRANSMITTER MOUNTED

SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-907	D
SCALE	NONE	SHEET	1 OF 1

DWG NO. CAT-912 SH 1 REV A

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APP
	A	PER REVISED ECP 500-115	160415	JD

ATEX/IECEx INSTALLATION INSTRUCTIONS

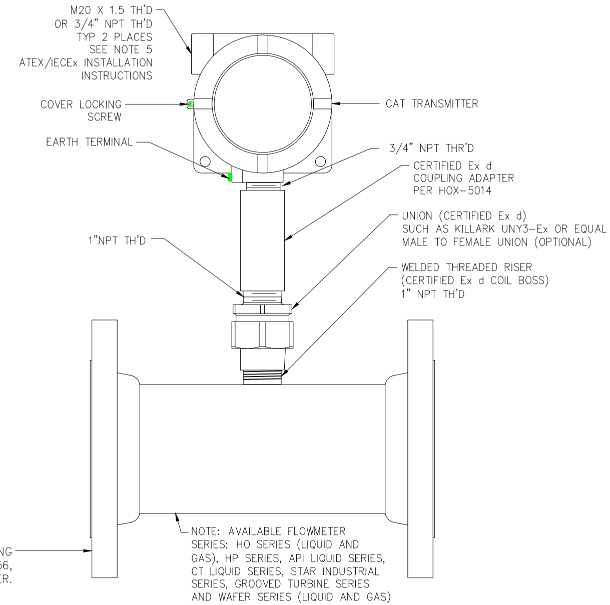
1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS Ex db IIB+H2 T6/T5 Gb; Ex tb IIIC T80°C/T86°C Db; IP66.
2. THE EQUIPMENT IS CERTIFIED FOR USE WITH AMBIENT TEMPERATURE RANGE OF −40°C TO 79°C FOR T6 AND −40°C TO 85°C FOR T5.
3. WHEN PROCESS TEMPERATURES ARE < −40°C AND > 85°C EXPLOSION PROOF ENCLOSURE WITH CAT TRANSMITTER WILL BE REMOTELY MOUNTED AWAY FROM FLOWMETER.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE WITH THE APPLICABLE CODE OF PRACTICE, NAMELY IEC 60079-14.
5. INSTRUMENT ENCLOSURE IS FURNISHED WITH M20 OR 3/4" NPT CONDUIT ENTRIES. M20 THREAD NOT ALLOWED FOR USE IN CANADA.
6. TIGHTEN THE COVER LOCKING SCREW TO PREVENT THE COVER FROM LOOSENING UNDER VIBRATION.
7. USE WIRED RATED FOR 90°C OR HIGHER.

CONDITIONS FOR SAFE USE: ATEX/IECEx

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS OR VAPORS.
2. SELECT AN INSTALLATION LOCATION SO THAT THE ENCLOSURE WILL NOT BE SUBJECTED TO IMPACT BY HEAVY OBJECTS.
3. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED. PLUGS MUST BE ATEX/IECEx CERTIFIED Ex d PLUGS.
4. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED Ex d, SUITABLE FOR THE CONDITIONS OF USE AND CORRECTLY INSTALLED.
5. CONDUIT ENTRIES MUST BE SEALED AT THE ENCLOSURE WALL.

MARKING

II 2 G Ex db IIB+H2 T6/T5 Gb
II 2 D Ex tb IIIC T80°C/T86°C Db; IP66
T6: −40°C < Ta < 79°C
T5: −40°C < Ta < 85°C



NEXT ASSY	USED ON	MATERIAL	DRAWN BALLANCE	DATE 141027
APPLICATION		FINISH	CHECK J.DEFEO	141027
			PROJ ENG J.DEFEO	141027

CONFIDENTIAL PROPERTY OF HOFFER FLOW CONTROLS, INC. (HFC) NOT TO BE DISCLOSED TO OTHERS, REPRODUCED, OR USED FOR ANY OTHER PURPOSE, EXCEPT AS AUTHORIZED IN WRITING BY HFC. MUST BE RETURNED ON DEMAND, ON COMPLETION OF ORDER OR OTHER PURPOSE FOR WHICH LENT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS:
2 PLACE DECIMALS ± .01
3 PLACE DECIMALS ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1/2°

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE INSTALLATION DWG, ATEX/IECEx Ex d CERTIFIED 8092TM – CAT TRANSMITTER MOUNTED

SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-912	A
SCALE NONE		SHEET 1 OF 1	

DWG NO.	CAT-914	SH 1	REV A

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APP
	A	PER REVISED ECP 500-115	160414	JD

CSA INSTALLATION INSTRUCTIONS

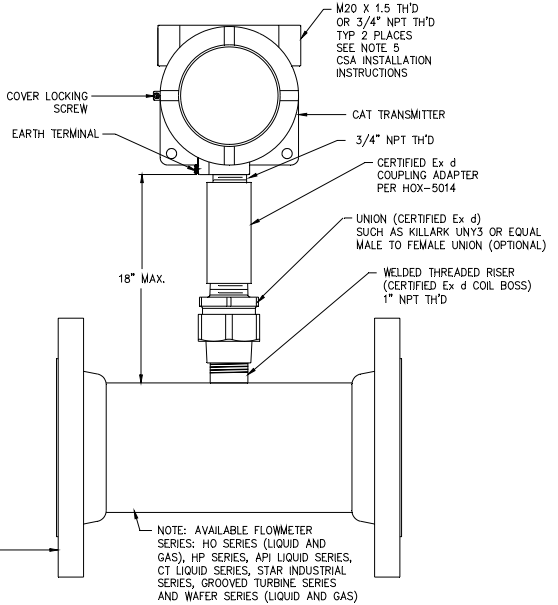
1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES, VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS, DIVISIONS XP: CLASS I, DIVISION 1, GROUPS B,C,D CLASS II, DIVISION 1, GROUPS E,F,G, CLASS III, TYPE 4X. ZONES FP CAN.: Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/86°C IIIDb; IP66 ZONES FP USA: CLASS I, ZONE 1, AEx db IIB+H2 T6/T5; Gb; CLASS I, ZONE 21, AEx tb T80°C/T86°C IIIC Db IP66
2. THE EQUIPMENT IS CERTIFIED FOR USE WITH AMBIENT TEMPERATURE RANGE OF −40°C TO 79°C FOR T6 AND −40°C TO 85°C FOR T5.
3. WHEN PROCESS TEMPERATURES ARE < −40°C AND > 85°C EXPLOSION PROOF ENCLOSURE WITH CAT TRANSMITTER WILL BE REMOTELY MOUNTED AWAY FROM FLOWMETER.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE WITH THE APPLICABLE CODE OF PRACTICE, NAMELY THE NATIONAL ELECTRIC CODE AND THE CANADIAN ELECTRICAL CODE.
5. INSTRUMENT ENCLOSURE IS FURNISHED WITH M20 OR 3/4" NPT CONDUIT ENTRIES. M20 THREAD NOT ALLOWED FOR USE IN CANADA.
6. TIGHTEN THE COVER LOCKING SCREW TO PREVENT THE COVER FROM LOOSENING UNDER VIBRATION.
7. USE WIRE RATED FOR 90°C OR HIGHER.

CONDITIONS FOR SAFE USE: CSA

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS OR VAPORS.
2. SELECT AN INSTALLATION LOCATION SO THAT THE ENCLOSURE WILL NOT BE SUBJECTED TO IMPACT BY HEAVY OBJECTS.
3. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED. PLUGS MUST BE CSA CERTIFIED FLAMEPROOF PLUGS.
4. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED FLAMEPROOF, SUITABLE FOR THE CONDITIONS OF USE AND CORRECTLY INSTALLED.
5. FOR CLASS 1, DIV 1 INSTALLATIONS, CONDUIT SEAL IS REQUIRED WITHIN 18" OF ENCLOSURE.

MARKING

CL.I, DIV.1, GR.B,C,D
CL.II, DIV.1, GR.E,F,G; CL.III; TYPE 4X
CL.I, ZONE 1 AEx db IIB+H2 T6/T5; Gb
Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db IP66
CLASS I, ZONE 21 AEx tb T80°C/T86°C IIIC Db; IP66
A SEAL SHALL BE INSTALLED WITHIN 18" OF ENCL.
T6: −40° < Ta < 79°; T5: < −40° < Ta < 85°
USE WIRE RATED 90°C OR HIGHER



		MATERIAL	DRAWN B.ALLANCE	DATE 141028
			CHECK J.DEFEO	141028
			PROJ ENG J.DEFEO	141028
		FINISH		
NEXT ASSY	USED ON			
APPLICATION				

CONFIDENTIAL PROPERTY OF HOFFER FLOW CONTROLS, INC. (HFC) NOT TO BE DISCLOSED TO OTHERS, REPRODUCED, OR USED FOR ANY OTHER PURPOSE, EXCEPT AS AUTHORIZED IN WRITING BY HFC. MUST BE RETURNED ON DEMAND, ON COMPLETION OF ORDER OR OTHER PURPOSE FOR WHICH LENT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS:

2 PLACE DECIMALS	± .01
3 PLACE DECIMALS	± .005
FRACTIONAL	± 1/64
ANGULAR	± 1/2°

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE
INSTALLATION DWG, CSA
FLAMEFPROOF CERTIFIED 8092TM
CAT TRANSMITTER MOUNTED

SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-914	A
SCALE	NONE	SHEET	1 OF 1

DWG NO.	CAT-917	SH 1	REV A

REVISIONS

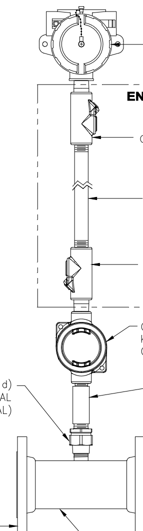
ZONE	REV	DESCRIPTION	DATE	APP
	A	PER ECP 500-118	160502	

NORTH AMERICA: REMOTE INSTALLATION NOTES

1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES, VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS.
   DIVISIONS XP: CLASS I, DIVISION 1, GROUPS B,C,D; CLASS II, DIVISION 1, GROUPS E,F,G CLASS III; TYPE 4X.
   ZONES FP CAN: Ex d IIB+H2 T6/T5; Gb; Ex tb T80°C/T86°C IIIC Db; IP66.
   ZONES FP USA: CLASS I, ZONE 1 AEx db IIB+H2 T6/T5.
   Gb; CLASS I, ZONE 21 AEx tb T80°C/T86°C IIIC Db; IP66.
2. THE END USER/OWNER IS RESPONSIBLE FOR THE SELECTION OF SUITABLE CABLE, CABLE GLANDS, UNIONS AND/OR CONDUIT.
3. ALL CABLE AND CABLE GLANDS MUST BE RATED FOR A MINIMUM OF 90°C.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE THE APPLICABLE CODE OF PRACTICE, NAMELY THE NATIONAL ELECTRIC CODE AND THE CANADIAN ELECTRICAL CODE.

CONDITIONS FOR SAFE USE–NORTH AMERICA

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS, VAPORS OR DUST.
2. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED WITH CERTIFIED FLAMEPROOF PLUGS.
3. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED FLAMEPROOF, SUITABLE FOR THE CONDITIONS OF USE AND CORRECTLY INSTALLED PER MANUFACTURES INSTRUCTIONS.
4. FOR CLASS I, DIVISION 1 INSTALLATIONS, THE CONDUIT SEAL AT THE REMOTE CAT SERIES TRANSMITTER AS FOLLOWS:
   ENCLOSURE MODEL XD-I80 (BLUE ALUMINUM): SEAL WITHIN 50mm OF ENCLOSURE.
   ENCLOSURE MODEL 8092TM (STAINLESS STEEL): SEAL WITHIN 18 INCHES OF ENCLOSURE.



THE INTERCONNECTIONS BETWEEN THE TWO (2) ENCLOSURES ARE ITEMS SUPPLIED BY THE END USER.

THE EQUIPMENT SHALL BE INSTALLED PER ALL APPLICABLE LOCAL INSTALLATION CODES AND IS SUBJECT TO INSPECTION BY LOCAL JURISDICTION HAVING AUTHORITY.

SEE INSTALLATION NOTE 4.

NEXT ASSY	USED ON	MATERIAL	DRAWN BALLANCE	DATE 160415
APPLICATION		FINISH	CHECK J.DEFEO	160415
			PROJ ENG J.DEFEO	160415

CONFIDENTIAL PROPERTY OF HOFFER FLOW CONTROLS, INC. (HFC) NOT TO BE DISCLOSED TO OTHERS, REPRODUCED, OR USED FOR ANY OTHER PURPOSE, EXCEPT AS AUTHORIZED IN WRITING BY HFC. MUST BE RETURNED ON DEMAND, ON COMPLETION OF ORDER OR OTHER PURPOSE FOR WHICH LENT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS:
2 PLACE DECIMALS ± .01
3 PLACE DECIMALS ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1/2°

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE: INSTALLATION DRAWING, REMOTE MOUNTED CAT-CSA

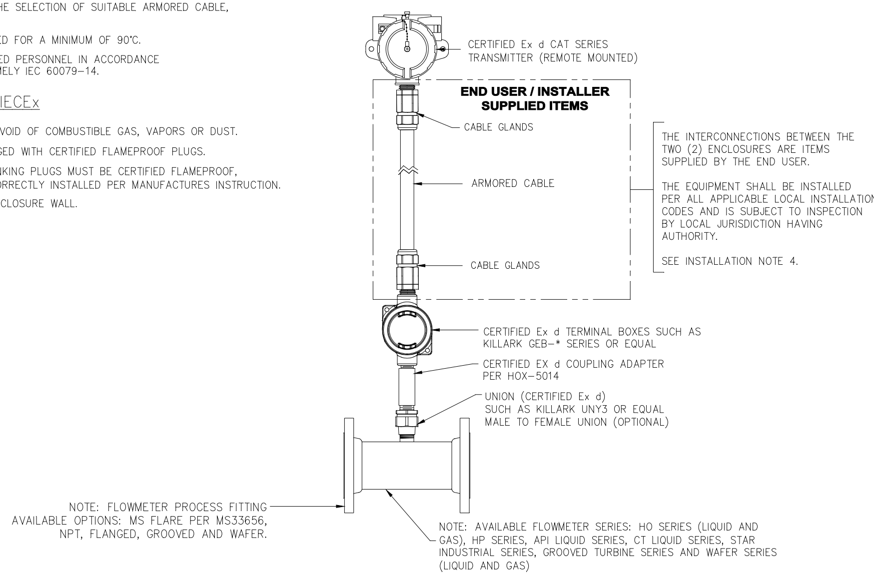
SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-917	A
SCALE NONE		SHEET 1 OF 1	

ATEX/IECEx REMOTE INSTALLATION NOTES

1. THE EQUIPMENT IS SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE GASES, VAPORS AND DUST. FOR USE INDOORS OR OUTDOORS IN HAZARDOUS LOCATIONS:
   Ex db IIB+H2 T6/T5; Gb; Ex tb IIIC 80°C/T86°C Db; IP66.
2. THE END USER/OWNER IS RESPONSIBLE FOR THE SELECTION OF SUITABLE ARMORED CABLE, CABLE GLANDS AND/OR UNIONS.
3. ALL CABLE AND CABLE GLANDS MUST BE RATED FOR A MINIMUM OF 90°C.
4. INSTALLATION SHALL BE PERFORMED BY TRAINED PERSONNEL IN ACCORDANCE WITH THE APPLICABLE CODE OF PRACTICE, NAMELY IEC 60079-14.

CONDITIONS FOR SAFE USE-ATEX/IECEx

1. DO NOT REMOVE THE COVER UNLESS AREA IS VOID OF COMBUSTIBLE GAS, VAPORS OR DUST.
2. ALL UNUSED CONDUIT ENTRIES MUST BE PLUGGED WITH CERTIFIED FLAMEPROOF PLUGS.
3. ALL CABLE/CONDUIT ENTRY DEVICES AND BLANKING PLUGS MUST BE CERTIFIED FLAMEPROOF, SUITABLE FOR THE CONDITION OF USE AND CORRECTLY INSTALLED PER MANUFACTURES INSTRUCTION.
4. CONDUIT ENTRIES MUST BE SEALED AT THE ENCLOSURE WALL.



DWG NO. CAT-918 SH 1 REV A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APP
	A	PER ECP 500-118	160502	

	DATE
DRAWN BALLANCE	160415
CHECK J.DEFEO	160415
PROJ ENG J.DEFEO	160415

MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION

CONFIDENTIAL PROPERTY OF HOFFER FLOW CONTROLS, INC. (HFC) NOT TO BE DISCLOSED TO OTHERS, REPRODUCED, OR USED FOR ANY OTHER PURPOSE, EXCEPT AS AUTHORIZED IN WRITING BY HFC. MUST BE RETURNED ON DEMAND, ON COMPLETION OF ORDER OR OTHER PURPOSE FOR WHICH LENT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, TOLERANCES OTHER THAN THE SIZE OF RAW MATERIAL SHALL BE HELD AS FOLLOWS:
2 PLACE DECIMALS ± .01
3 PLACE DECIMALS ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1/2°

HOFFER FLOW CONTROLS, INC
ELIZABETH CITY, NC 27909

TITLE INSTALLATION DRAWING, REMOTE MOUNTED CAT – ATEX/IECEx

SIZE	CAGE CODE	DWG NO	REV
C	33321	CAT-918	A

SCALE NONE SHEET 1 OF 1