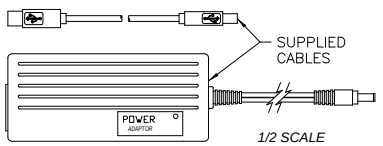
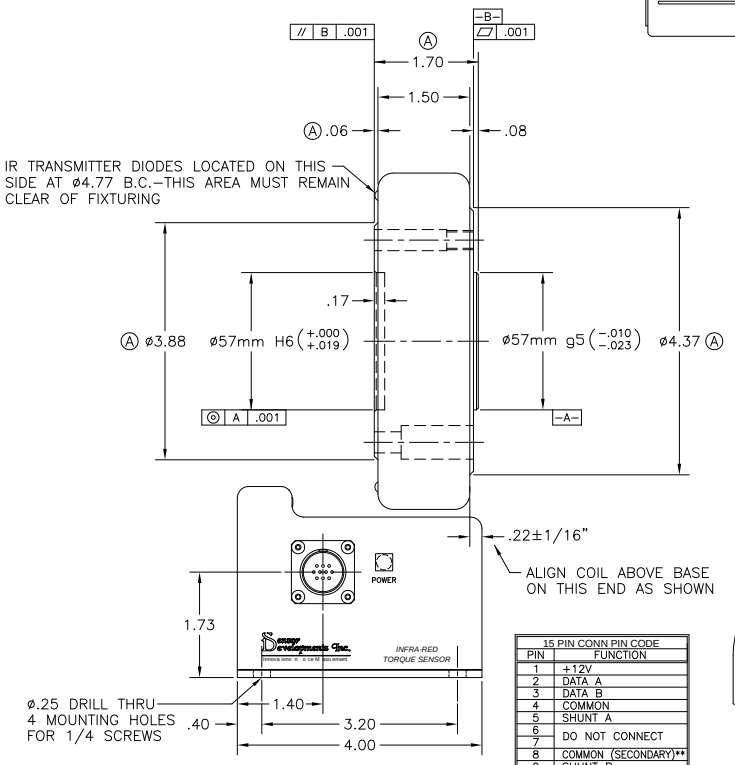
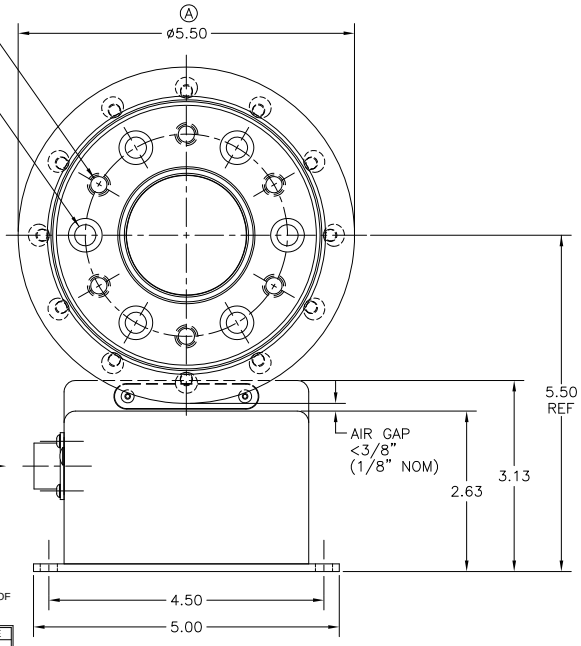
FLATNESS OF A SURFACE	PERPENDICULARITY
STRAIGHTNESS OF A LINE	PARALLELISM
ROUNDNESS	ANGULARITY
CYLINDRICITY	CIRCULAR RUNOUT
PROFILE OF A SURFACE	TOTAL RUNOUT
PROFILE OF A LINE	TRUE POSITION
SYMMETRY	CONCENTRICITY

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
–	REL. FOR PRODUCTION	–	–	–	–	1-9-12
A	ø5.50 WAS ø6.63; ø3.88	GMC	1-16-12			– –
	WAS ø4.75; ø4.37 WAS					
	ø5.36; 1.70 WAS 1.84;					
	.06 WAS .17; M8 TAP–					
	11mm DEEP WAS 20mm					
	DEEP; 14mm C'BORE–					
	30mm DEEP WAS 31mm					
	DEEP; MAX RPM WAS					
	15,000; APPROX. ELEMENT					
	WEIGHT ADDED					



1/2 SCALE





10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT
H	CONNECT
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

PT06E–12–10S CONNECTOR

A COND CABLE – B FT

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

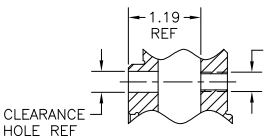
NOTE ERROR RELAY CONTACTS ARE SHARED BETWEEN RESPECTIVE PINS OF FREQUENCY & ANALOG CONNECTORS

SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS



VIEW A

15 PIN D–SUB CONNECTOR

Z

(3) 9 PIN D–SUB CONNECTOR MATING CONNECTORS SUPPLIED

RECEIVER–16.7W X 6.0L X 1.7H

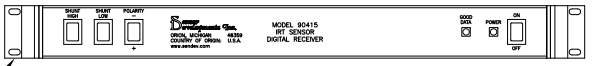
POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20929D0–*
*–INDICATES CURRENT REV

SPECIFICATIONS MODEL: 90415–0AX–AA0X0

CAPACITY – TORQUE	CHARTED
OVERLOAD CAPACITY (%F.S. CAPACITY)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.	±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA) 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.05%
RESOLUTION	16 BIT
MAX RPM	6,000 Ⓐ
SENSOR MATERIAL	STEEL
ELEMENT WEIGHT (APPROX.)	5.0 LBS. (1.9Kg) Ⓐ

MODEL NO.	A	B
CABLE LENGTH OPTION		
90415–0AX–AA0G0	8	100 FT
90415–0AX–AA0F0	8	70 FT
90415–0AX–AA0E0	8	90 FT
90415–0AX–AA0D0	6	25 FT
90415–0AX–AA0C0	8	80 FT
90415–0AX–AA0B0	8	60 FT
90415–0AX–AA0A0	6	20 FT

**FOR 8 COND CABLE TYPE ONLY



RACK MOUNT BRACKET REF

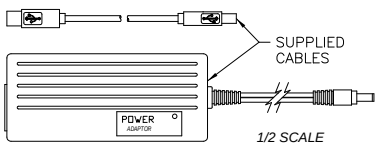
VIEW Z
1/2 SCALE

MODEL NO.	Nm	IN. LBS.
CAPACITY OPTION		
90415–0AB–AA0X0	200	(1,770)
90415–0AA–AA0X0	100	(885)

INSTALLATION MODEL: 90415–0AX–AA0X0	CHECKED BY D.S.
FINISH / SCALE FULL	PROJ. ENG. D.S.
MATRL.	DRAWN BY GMC
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5'	DATE 1–6–12
	D.E. REVIEW
	BY / DATE
	DRAWING NUMBER 20930D0–A

FLATNESS OF A SURFACE	PERPENDICULARITY
STRAIGHTNESS OF A LINE	PARALLELISM
ROUNDNESS	ANGULARITY
CYLINDRICITY	CIRCULAR RUNOUT
PROFILE OF A SURFACE	TOTAL RUNOUT
PROFILE OF A LINE	TRUE POSITION
SYMMETRY	CONCENTRICITY

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
–	REL. FOR PRODUCTION	–	-	–	–	- -



1/2 SCALE

10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT CONNECT
H	
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

NOTE ERROR RELAY CONTACTS ARE SHARED BETWEEN RESPECTIVE PINS OF FREQUENCY & ANALOG CONNECTORS

SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20929D0–*
*–INDICATES CURRENT REV

SPECIFICATIONS MODEL: 90415–0AX–AA0X0

CAPACITY – TORQUE	CHARTED
OVERLOAD CAPACITY (%F.S. CAPACITY)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.	±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA) 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.05%
RESOLUTION	16 BIT
MAX RPM	15,000
SENSOR MATERIAL	STEEL

90415–0AX–AA0G0	8	100 FT
90415–0AX–AA0F0	8	70 FT
90415–0AX–AA0E0	8	90 FT
90415–0AX–AA0D0	6	25 FT
90415–0AX–AA0C0	8	80 FT
90415–0AX–AA0B0	8	60 FT
90415–0AX–AA0A0	6	20 FT
MODEL NO.	A	B
CABLE LENGTH OPTION		

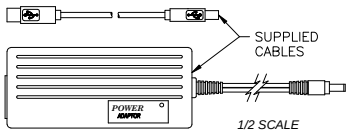
**FOR 8 COND CABLE TYPE ONLY

90415–0AB–AA0X0	200	(1,770)
90415–0AA–AA0X0	100	(885)
MODEL NO.	Nm	IN. LBS.
CAPACITY OPTION		

INSTALLATION MODEL: 90415–0AX–AA0X0	CHECKED BY
FINISH / SCALE FULL	PROJ. ENG.
MATRL.	DRAWN BY GMC
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5'	DATE 1–6–12
	D.E. REVIEW BY / DATE
	DRAWING NUMBER 20930D0–0

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
–	REL. FOR PRODUCTION	–	–	–	–	9-14-11
A	CAPACITY CHARTED	GMC	2-6-12	DS	DS	2-10-12

FLATNESS OF A SURFACE	PERPENDICULARITY
STRAIGHTNESS OF A LINE	PARALLELISM
ROUNDNESS	ANGULARITY
CYLINDRICITY	CIRCULAR RUNOUT
PROFILE OF A SURFACE	TOTAL RUNOUT
PROFILE OF A LINE	TRUE POSITION
SYMMETRY	CONCENTRICITY



10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT CONNECT
H	
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

NOTE: ERROR RELAY CONTACTS ARE SHARED BETWEEN RESPECTIVE PINS OF FREQUENCY & ANALOG CONNECTORS

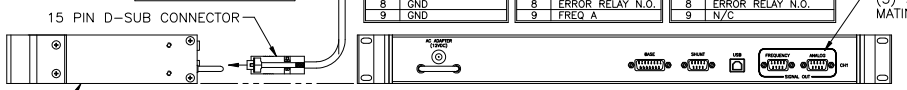
SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS

90415–0AC–AA0X0	1,000	(8,500)
90415–00S–AA0X0	500	(4,425)
MODEL NO.	Nm	IN. LBS.
CAPACITY OPTION		

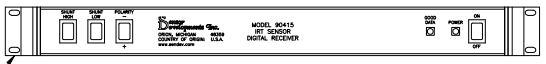


SPECIFICATIONS — MODEL: 90415–0XX–AA0X0

CAPACITY – TORQUE	CHARTED
OVERLOAD CAPACITY (%F.S. CAPACITY)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.	±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA)
	10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.05%
RESOLUTION	16 BIT
MAX RPM	15,000
SENSOR MATERIAL	STEEL
ELEMENT WEIGHT (APPROX.)	6.0 LBS.

90415–0XX–AA0G0	8	100 FT
90415–0XX–AA0F0	8	70 FT
90415–0XX–AA0E0	8	90 FT
90415–0XX–AA0D0	6	25 FT
90415–0XX–AA0C0	8	80 FT
90415–0XX–AA0B0	8	60 FT
90415–0XX–AA0A0	6	20 FT
MODEL NO.	A	B
CABLE LENGTH OPTION		

**FOR 8 COND CABLE TYPE ONLY



VIEW Z
1/2 SCALE

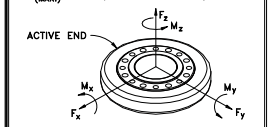
POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20848D0–*
*–INDICATES CURRENT REV

INSTALLATION MODEL: 90415–0XX–AA0X0		CHECKED BY D.S.
		PROJ. ENG. D.S.
FINISH	SCALE FULL	DRAWN BY GMC
MATRL.		DATE 9–13–11
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5°		D.E. REVIEW BY DATE
		DRAWING NUMBER 20849D0–A

EXTRANEOUS LOAD EQUATION (MAX. STRESS)

$\sigma_{(MAX.)} = aF_x + bF_y + cF_z + dM_x + eM_y + fM_z$

$\sigma_{(MAX.)} = 40{,}000psi$ DYNAMIC OR $80{,}000psi$ STATIC



MODEL NO.	EXTRANEOUS LOAD VALUES a=b	c	d=e	f	SPRING RATES (#/IN OR IN #/RAD x 10^6) Kx=Ky	Kz	KMx=KMy	KMz
90415-00F	3.23	1.15	1.93	1.61	13.2	68.6	52.9	40.7

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
D	90415-00Z-AA0X0 ADDED	GMC	12-20-11	–	–	12-20-11
E	90415-0AL-AA0X0 ADDED	GMC	7-6-12	DS	DS	7-12-12
F	90415-0XX-AAXJ0 ADDED	GMC	3-25-14	–	–	3-25-14
G	MAX STRESS PSI REVISED;	GMC	7-14-14	DS	DS	3-24-15
	BASE ASSY REV'D	GMC	3-24-15			
H	G2.5 @ 7,000 RPM WAS	GMC	4-12-16			- -
	3,000 RPM					

10 PIN CONN PIN CODE PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT CONNECT
H	
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

SHUNT 9 PIN CONN PIN CODE PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ. B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ. A

ANALOG 9 PIN CONN PIN CODE PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

SPECIFICATIONS MODEL: 90415–0XX–AA0X0

CAPACITY –TORQUE F.S. — CHARTED
OVERLOAD CAPACITY (%F.S.) — 150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.
±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA)
10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL) — G 2.5 @ 7,000 RPM Ⓗ
ACCURACY (%F.S. OUTPUT) — .05%
RESOLUTION — 16 BIT
MAX RPM — 7,000
SENSOR MATERIAL — STEEL

MODEL NO.	A	B
90415-0XX-AA0L0	6	40 FT
90415-0XX-AA0K0	6	10 FT
90415-0XX-AA0J0	8	150 FT
90415-0XX-AA0G0	8	100 FT
90415-0XX-AA0F0	8	70 FT
90415-0XX-AA0E0	8	90 FT
90415-0XX-AA0D0	6	25 FT
90415-0XX-AA0C0	8	80 FT
90415-0XX-AA0B0	8	60 FT
90415-0XX-AA0A0	6	20 FT

CABLE LENGTH OPTION

**FOR 8 COND CABLE TYPE ONLY

MODEL NO.	Nm	IN. LBS.	FT. LBS.
90415-0AL-AA0X0	2,500	(22,100)	(1,842)
90415-00Z-AA0X0	(4,068)	(36,000)	3,000
90415-00V-AA0X0	2,000	(17,700)	(1,475)
90415-00F-AA0X0	3,000	(26,550)	(2,212)

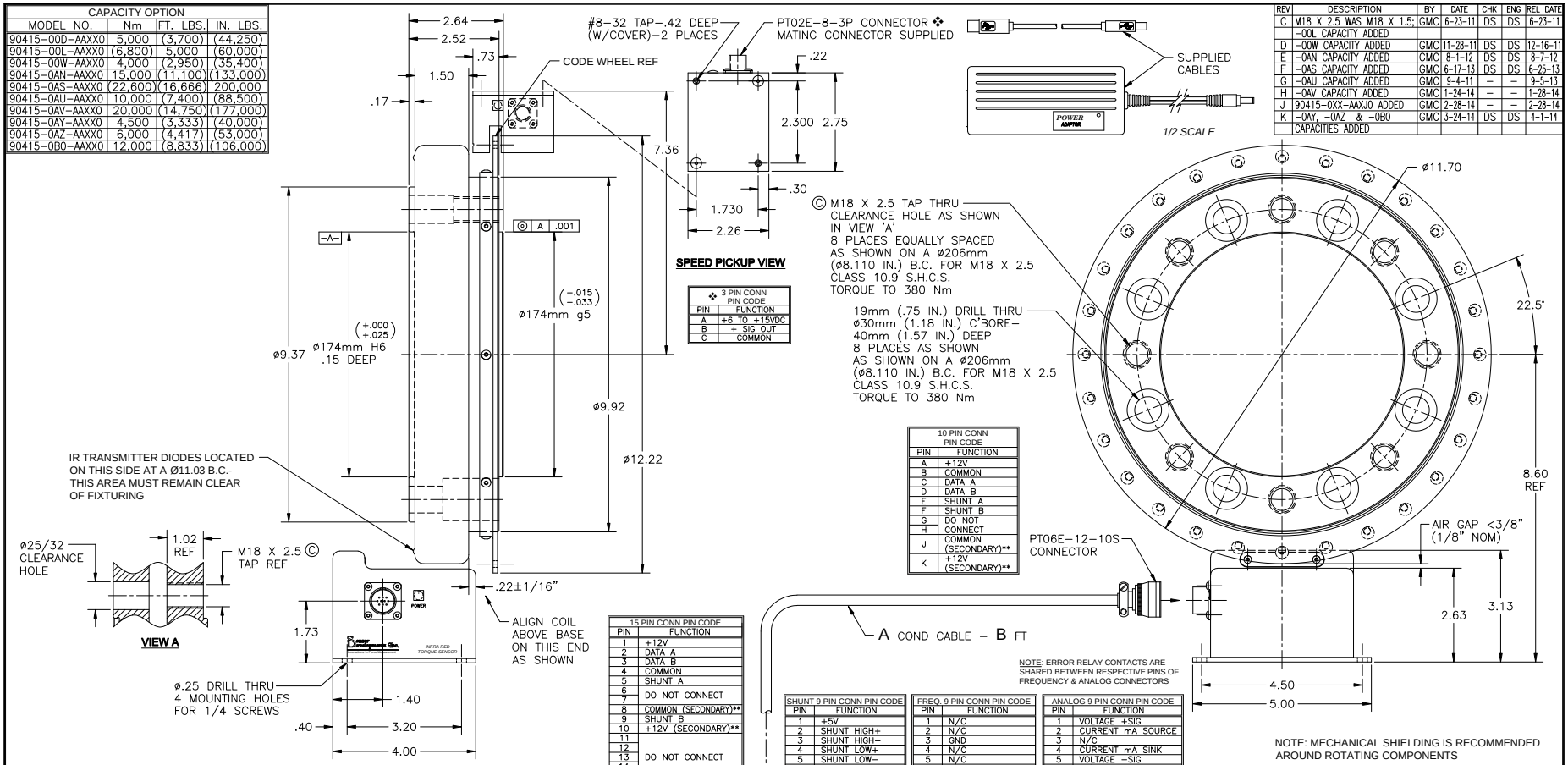
CAPACITY OPTION

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20651D0–*
*–INDICATES CURRENT REV

INSTALLATION MODEL: 90415–0XX–AA0X0	CHECKED BY D.S.
	PROJ. ENG. D.S.
FINISH	SCALE FULL
MATRL.	DRAWN BY GMC
	DATE 10–14–10
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5'	D.E. REVIEW BY DATE
	DRAWING NUMBER 20652D0–H

CAPACITY OPTION			
MODEL NO.	Nm	FT. LBS.	IN. LBS.
90415-00D-AAXX0	5,000	(3,700)	(44,250)
90415-00L-AAXX0	(6,800)	5,000	(60,000)
90415-00W-AAXX0	4,000	(2,950)	(35,400)
90415-0AN-AAXX0	15,000	(11,100)	(133,000)
90415-0AS-AAXX0	(22,600)	(16,666)	200,000
90415-0AU-AAXX0	10,000	(7,400)	(88,500)
90415-0AV-AAXX0	20,000	(14,750)	(177,000)
90415-0AY-AAXX0	4,500	(3,333)	(40,000)
90415-0AZ-AAXX0	6,000	(4,417)	(53,000)
90415-0B0-AAXX0	12,000	(8,833)	(106,000)

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
C	M18 X 2.5 WAS M18 X 1.5; -00L CAPACITY ADDED	GMC	6-23-11	DS	DS	6-23-11
D	-00W CAPACITY ADDED	GMC	11-28-11	DS	DS	12-16-11
E	-0AN CAPACITY ADDED	GMC	8-1-12	DS	DS	8-7-12
F	-0AS CAPACITY ADDED	GMC	6-17-13	DS	DS	6-25-13
G	-0AU CAPACITY ADDED	GMC	9-4-11	–	–	9-5-13
H	-0AV CAPACITY ADDED	GMC	1-24-14	–	–	1-28-14
J	90415-0XX-AAXJ0 ADDED	GMC	2-28-14	–	–	2-28-14
K	-0AY, -0AZ & -0B0 CAPACITIES ADDED	GMC	3-24-14	DS	DS	4-1-14



3 PIN CONN PIN CODE	
PIN	FUNCTION
A	+6 TO +15VDC
B	+ SIG OUT
C	COMMON

10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT CONNECT
H	DO NOT CONNECT
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH-
4	SHUNT LOW+
5	SHUNT LOW-
6	SHUNT POLARITY+
7	SHUNT POLARITY-
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE -SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

SPECIFICATIONS MODEL: 90415-0XX-AAXX0

CAPACITY - TORQUE — CHARTED Ⓒ
OVERLOAD CAPACITY (%F.S.) — 150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.:
±5V, ±10V, 2.5±2.5V, 12±8mA (4-20mA), 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL) — G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT) — .05%
RESOLUTION — 16 BIT
MAX RPM — 6,000

SPEED PICKUP OPTION (MODEL: 90415-0XX-AABX0)

POWER SUPPLY — 6 TO 15VDC
OUTPUT CONFIGURATION — OPEN DRAIN W/470 OHM PULL-UP RESISTOR TO POWER SUPPLY
OPERATIONAL SPEED — 100 TO 6,000 RPM
RESOLUTION — 180 PPR

90415-0XX-AAXJ0	8	150 FT
90415-0XX-AAXG0	8	100 FT
90415-0XX-AAXF0	8	70 FT
90415-0XX-AAXE0	8	90 FT
90415-0XX-AAXD0	6	25 FT
90415-0XX-AAXC0	8	80 FT
90415-0XX-AAXB0	8	60 FT
90415-0XX-AAXA0	6	20 FT
MODEL NO.	A	B
CABLE LENGTH OPTION		

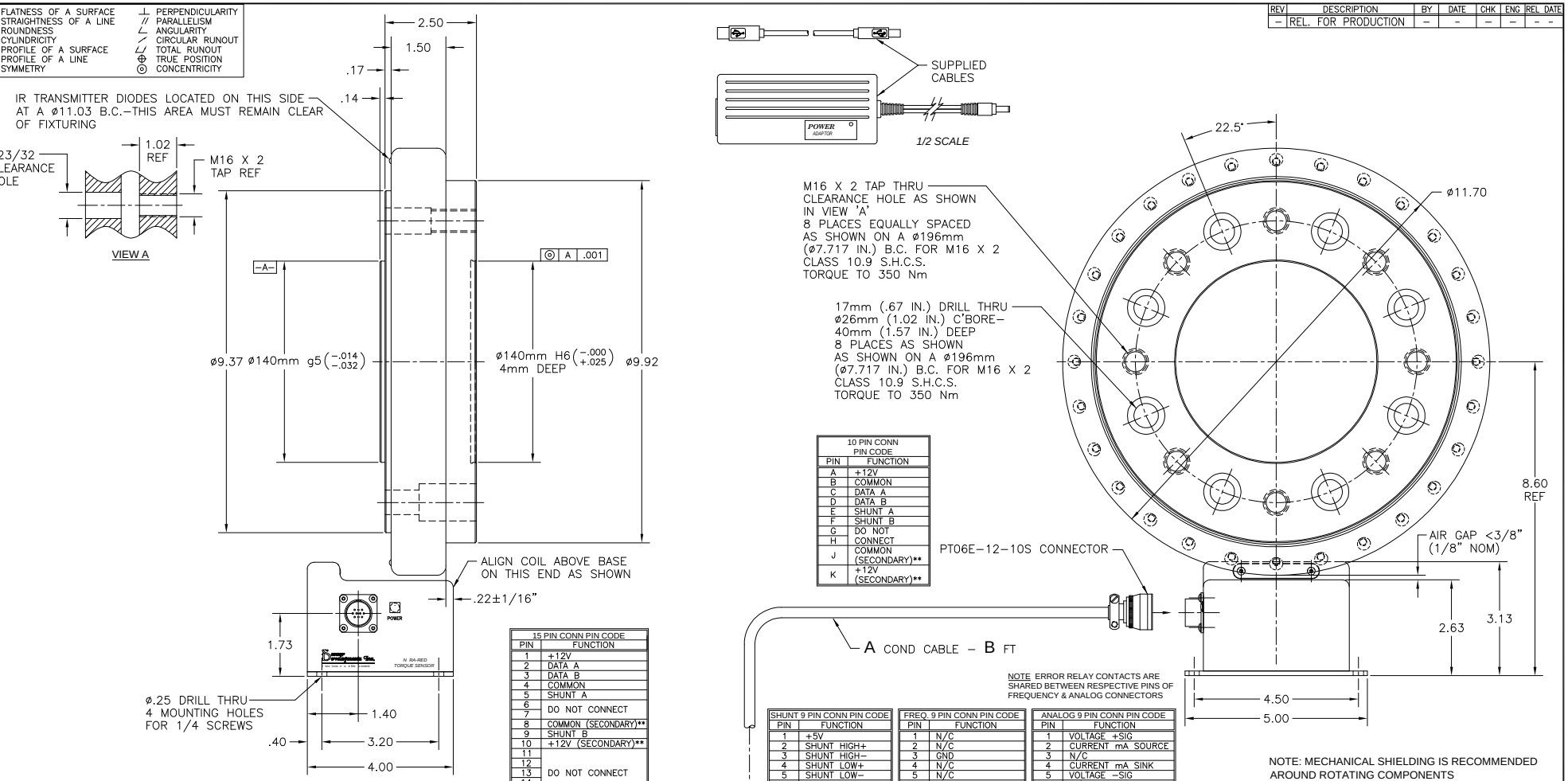
**FOR 8 COND CABLE TYPE ONLY

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20541D0-*
*-INDICATES CURRENT REV

INSTALLATION MODEL: 90415-0XX-AAXX0	CHECKED BY D.S.
FINISH	PROJ. ENG. D.S.
SCALE 3/4	DRAWN BY GMC
MATRL.	DATE 5-11-10
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5°	D.E. REVIEW BY DATE
	DRAWING NUMBER 20542D0-K

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
–	REL. FOR PRODUCTION	–	–	–	–	– –

FLATNESS OF A SURFACE	PERPENDICULARITY
STRAIGHTNESS OF A LINE	PARALLELISM
ROUNDNESS	ANGULARITY
CYLINDRICITY	CIRCULAR RUNOUT
PROFILE OF A SURFACE	TOTAL RUNOUT
PROFILE OF A LINE	TRUE POSITION
SYMMETRY	CONCENTRICITY



10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT
H	CONNECT
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20688D0–*
*–INDICATES CURRENT REV

SPECIFICATIONS MODEL: 90415–00J–AA0X0

CAPACITY TORQUE Nm (FT. LBS.) F.S.	12,000 (8,800)
OVERLOAD CAPACITY (%F.S.)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.:	±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA), 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.10%
RESOLUTION	16 BIT
MAX RPM	6,000

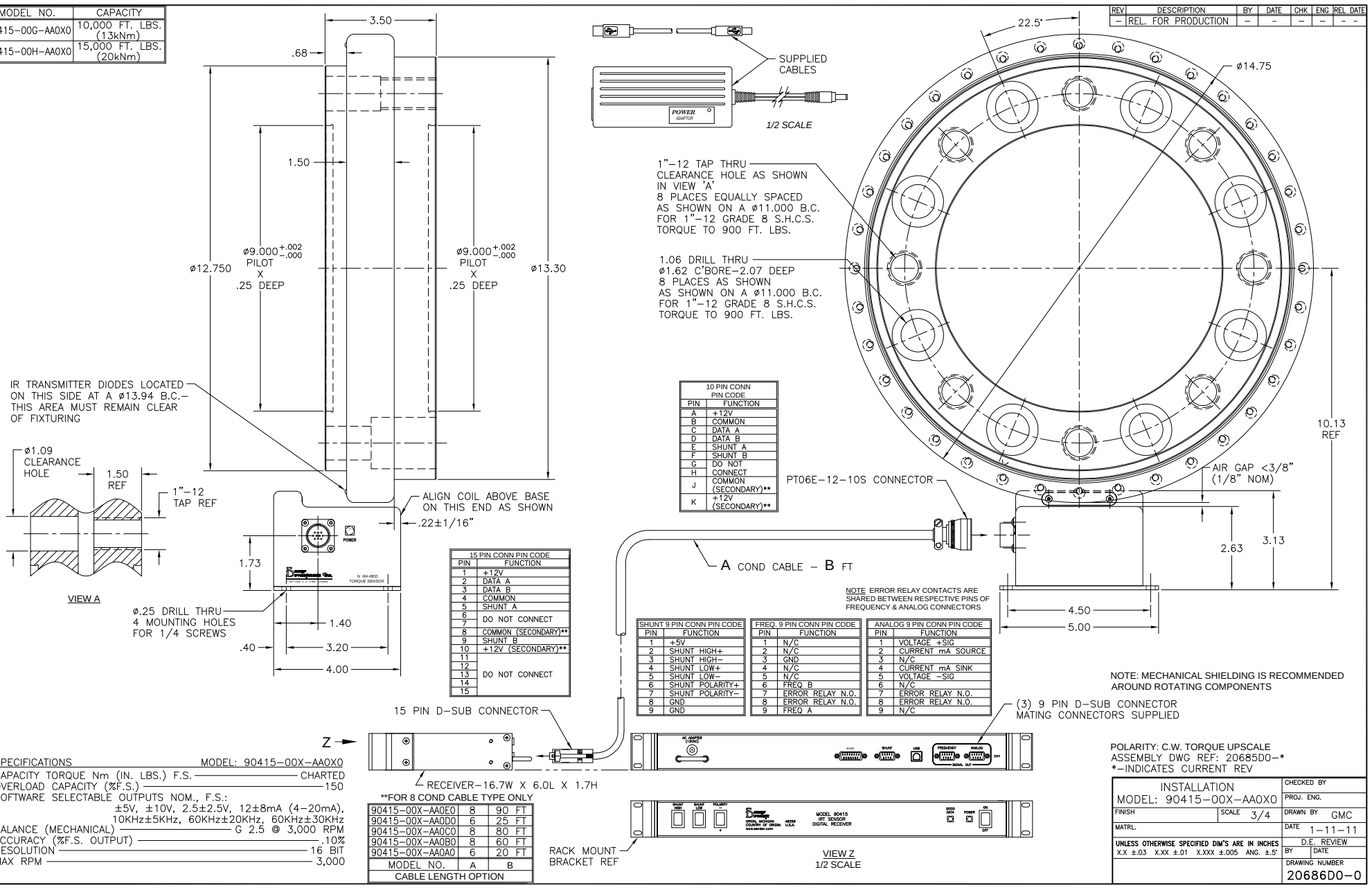
**FOR 8 COND CABLE TYPE ONLY

90415–00J–AA0E0	8	90 FT
90415–00J–AA0D0	6	25 FT
90415–00J–AA0C0	8	80 FT
90415–00J–AA0B0	8	60 FT
90415–00J–AA0A0	6	20 FT
MODEL NO.	A	B
CABLE LENGTH OPTION		

INSTALLATION MODEL: 90415–00J–AA0X0	CHECKED BY
FINISH	PROJ. ENG.
SCALE 3/4	DRAWN BY GMC
MATRL.	DATE 1–14–11
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5°	D.E. REVIEW BY DATE
	DRAWING NUMBER 20689D0–0

MODEL NO.	CAPACITY
90415-00G-AA0X0	10,000 FT. LBS. (13kNm)
90415-00H-AA0X0	15,000 FT. LBS. (20kNm)

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
–	REL. FOR PRODUCTION	–	–	–	–	– –



10 PIN CONN PIN CODE	
PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT
H	CONNECT
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

15 PIN CONN PIN CODE	
PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

NOTE ERROR RELAY CONTACTS ARE SHARED BETWEEN RESPECTIVE PINS OF FREQUENCY & ANALOG CONNECTORS

SHUNT 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH–
4	SHUNT LOW+
5	SHUNT LOW–
6	SHUNT POLARITY+
7	SHUNT POLARITY–
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

ANALOG 9 PIN CONN PIN CODE	
PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE –SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20685D0–*
*–INDICATES CURRENT REV

SPECIFICATIONS — MODEL: 90415–00X–AA0X0

CAPACITY TORQUE Nm (IN. LBS.) F.S.	CHARTED
OVERLOAD CAPACITY (%F.S.)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.:	±5V, ±10V, 2.5±2.5V, 12±8mA (4–20mA), 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.10%
RESOLUTION	16 BIT
MAX RPM	3,000

**FOR 8 COND CABLE TYPE ONLY

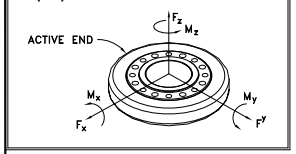
90415–00X–AA0E0	8	90 FT
90415–00X–AA0D0	6	25 FT
90415–00X–AA0C0	8	80 FT
90415–00X–AA0B0	8	60 FT
90415–00X–AA0A0	6	20 FT
MODEL NO.	A	B
CABLE LENGTH OPTION		

INSTALLATION MODEL: 90415–00X–AA0X0	CHECKED BY
FINISH	PROJ. ENG.
SCALE 3/4	DRAWN BY GMC
MATRL.	DATE 1–11–11
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5°	D.E. REVIEW BY DATE
	DRAWING NUMBER 20686D0–0

EXTRANEOUS LOAD EQUATION (MAX. STRESS)

$\sigma_{(MAX.)} = aF_x + bF_y + cF_z + dM_x + eM_y + fM_z$

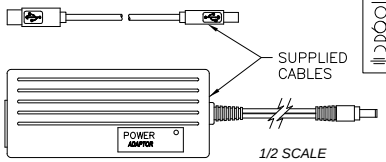
$\sigma_{(MAX.)} = 40{,}000$psi DYNAMIC OR $80{,}000$psi STATIC



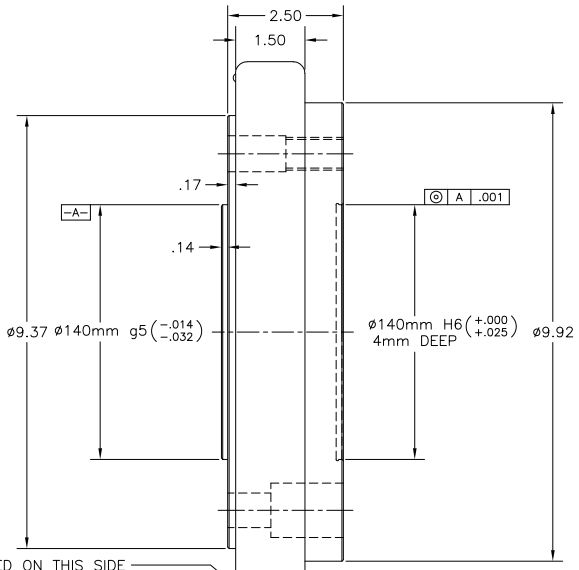
MODEL NO.	EXTRANEOUS LOAD VALUES a=b	c	d=e	f	SPRING RATES (#/IN OR IN #/RAD x 10^6) Kx=Ky	Kz	KMx=KMy	KMz
90415-00J	1.46	.44	.37	.31	26.4	137	404	310
90415-0AD	2.34	.71	.58	.48	16.5	85.6	258	198
90415-0AM	1.46	.44	.37	.31	26.4	137	404	310

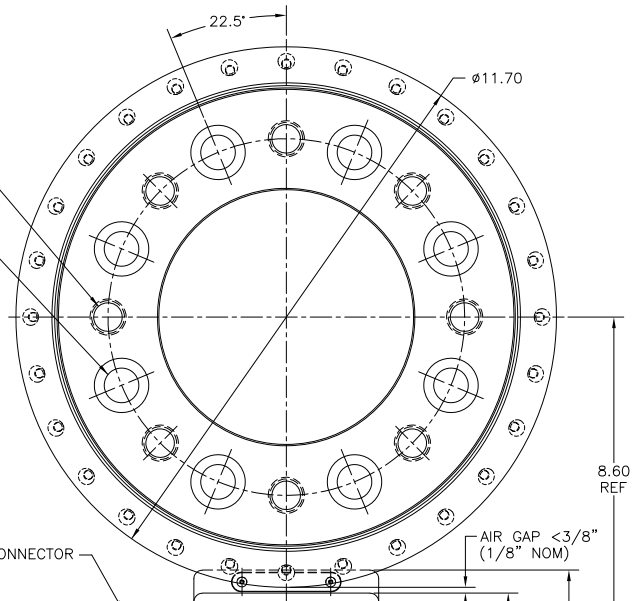
FLATNESS OF A SURFACE; STRAIGHTNESS OF A LINE; ROUNDNESS; CYLINDRICITY; PROFILE OF A SURFACE; PROFILE OF A LINE; SYMMETRY; PERPENDICULARITY; PARALLELISM; ANGULARITY; CIRCULAR RUNOUT; TOTAL RUNOUT; TRUE POSITION; CONCENTRICITY

REV	DESCRIPTION	BY	DATE	CHK	ENG	REL DATE
B	EXT. LOAD & SPRING	GMC	2-3-12	DS	DS	2-14-12
	RATE VALUES REV'D;					
	CAPACITY CHARTED					
C	90415-0AM-AA0X0 ADDED	GMC	7-6-12	DS	DS	7-12-12



1/2 SCALE





10 PIN CONN PIN CODE PIN	FUNCTION
A	+12V
B	COMMON
C	DATA A
D	DATA B
E	SHUNT A
F	SHUNT B
G	DO NOT
H	CONNECT
J	COMMON (SECONDARY)**
K	+12V (SECONDARY)**

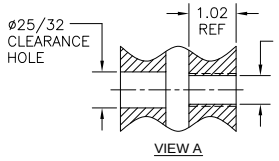
IR TRANSMITTER DIODES LOCATED ON THIS SIDE AT A ø11.03 B.C.-THIS AREA MUST REMAIN CLEAR OF FIXTURING

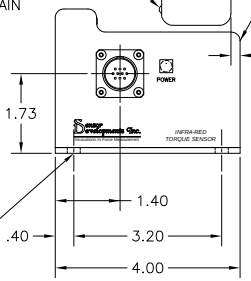
ALIGN COIL ABOVE BASE ON THIS END AS SHOWN

.22±1/16"

PT06E-12-10S CONNECTOR

AIR GAP <3/8" (1/8" NOM)





15 PIN CONN PIN CODE PIN	FUNCTION
1	+12V
2	DATA A
3	DATA B
4	COMMON
5	SHUNT A
6	DO NOT CONNECT
7	
8	COMMON (SECONDARY)**
9	SHUNT B
10	+12V (SECONDARY)**
11	DO NOT CONNECT
12	
13	
14	
15	

A COND CABLE - B FT

NOTE: ERROR RELAY CONTACTS ARE SHARED BETWEEN RESPECTIVE PINS OF FREQUENCY & ANALOG CONNECTORS

SHUNT 9 PIN CONN PIN CODE PIN	FUNCTION
1	+5V
2	SHUNT HIGH+
3	SHUNT HIGH-
4	SHUNT LOW+
5	SHUNT LOW-
6	SHUNT POLARITY+
7	SHUNT POLARITY-
8	GND
9	GND

FREQ. 9 PIN CONN PIN CODE PIN	FUNCTION
1	N/C
2	N/C
3	GND
4	N/C
5	N/C
6	FREQ B
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	FREQ A

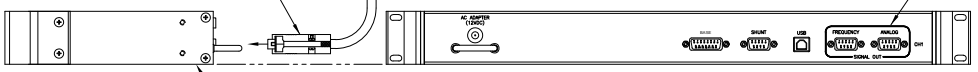
ANALOG 9 PIN CONN PIN CODE PIN	FUNCTION
1	VOLTAGE +SIG
2	CURRENT mA SOURCE
3	N/C
4	CURRENT mA SINK
5	VOLTAGE -SIG
6	N/C
7	ERROR RELAY N.O.
8	ERROR RELAY N.O.
9	N/C

NOTE: MECHANICAL SHIELDING IS RECOMMENDED AROUND ROTATING COMPONENTS

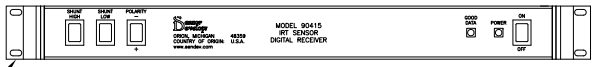
15 PIN D-SUB CONNECTOR

(3) 9 PIN D-SUB CONNECTOR MATING CONNECTORS SUPPLIED

Z



RECEIVER-16.7W X 6.0L X 1.7H



RACK MOUNT BRACKET REF

VIEW Z
1/2 SCALE

POLARITY: C.W. TORQUE UPSCALE
ASSEMBLY DWG REF: 20688D0-*
*-INDICATES CURRENT REV

SPECIFICATIONS MODEL: 90415-0XX-AA0X0

CAPACITY-TORQUE F.S.	CHARTED
OVERLOAD CAPACITY (%F.S.)	150
SOFTWARE SELECTABLE OUTPUTS NOM., F.S.:	±5V, ±10V, 2.5±2.5V, 12±8mA (4-20mA), 10KHz±5KHz, 60KHz±20KHz, 60KHz±30KHz
BALANCE (MECHANICAL)	G 2.5 @ 3,000 RPM
ACCURACY (%F.S. OUTPUT)	.10%
RESOLUTION	16 BIT
MAX RPM	6,000

MODEL NO.	Nm	IN. LBS.
90415-0AM-AA0X0	15,000	(133,000)
90415-0AD-AA0X0	10,000	(88,500)
90415-00J-AA0X0	(15,818)	140,000

CAPACITY OPTION

MODEL NO.	A	B
90415-0XX-AA0G0	8	100 FT
90415-0XX-AA0F0	8	70 FT
90415-0XX-AA0E0	8	90 FT
90415-0XX-AA0D0	6	25 FT
90415-0XX-AA0C0	8	80 FT
90415-0XX-AA0B0	8	60 FT
90415-0XX-AA0A0	6	20 FT

CABLE LENGTH OPTION

**FOR 8 COND CABLE TYPE ONLY

INSTALLATION MODEL: 90415-0XX-AA0X0	
FINISH	SCALE 3/4
MATRL.	
UNLESS OTHERWISE SPECIFIED DIM'S ARE IN INCHES X.X ±.03 X.XX ±.01 X.XXX ±.005 ANG. ±.5°	
CHECKED BY	D.S.
PROJ. ENG.	D.S.
DRAWN BY	GMC
DATE	1-14-11
D.E. REVIEW BY	DATE
DRAWING NUMBER	20689D0-C