



### SS443A



*Actual product appearance may vary.*

**SS400 Series Unipolar Hall-Effect  
Digital Position Sensor; radial lead IC  
package**

#### Features

- Digital current sinking output
- Quad-Hall design virtually eliminates mechanical stress effects
- Temperature compensated magnetics
- Operate/release points can be customized
- High output current capability
- Operate/release points symmetrical around zero gauss (bipolar/latch)
- Package material: Plaskon 3300H
- Surface mount version available: SS400-S (with cut and formed leads)

#### Potential Applications

- Speed and RPM sensor
- Brushless DC motor commutation
- Motor and fan control
- Magnetic encoding
- Tachometer, counter pickup
- Disc speed, tape rotation sensing
- Flow-rate sensing

#### Description

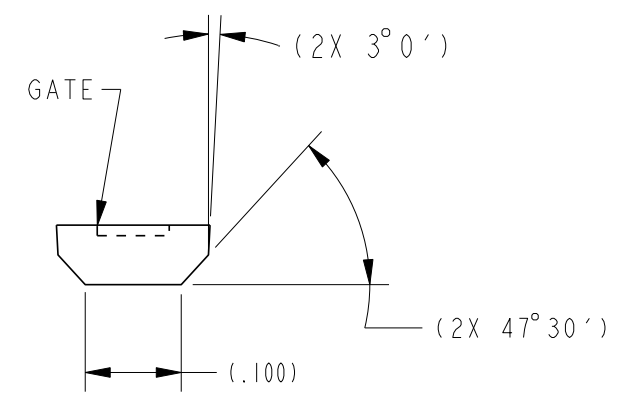
SS400 Series position sensors have a thermally balanced integrated circuit over full temperature range. The negative compensation slope is optimized to match the negative temperature coefficient of lower cost magnets. Bipolar, latching and unipolar magnetics are available.

Band gap regulation provides extremely stable operation over 3.8 Vdc to 30 Vdc supply voltage range.

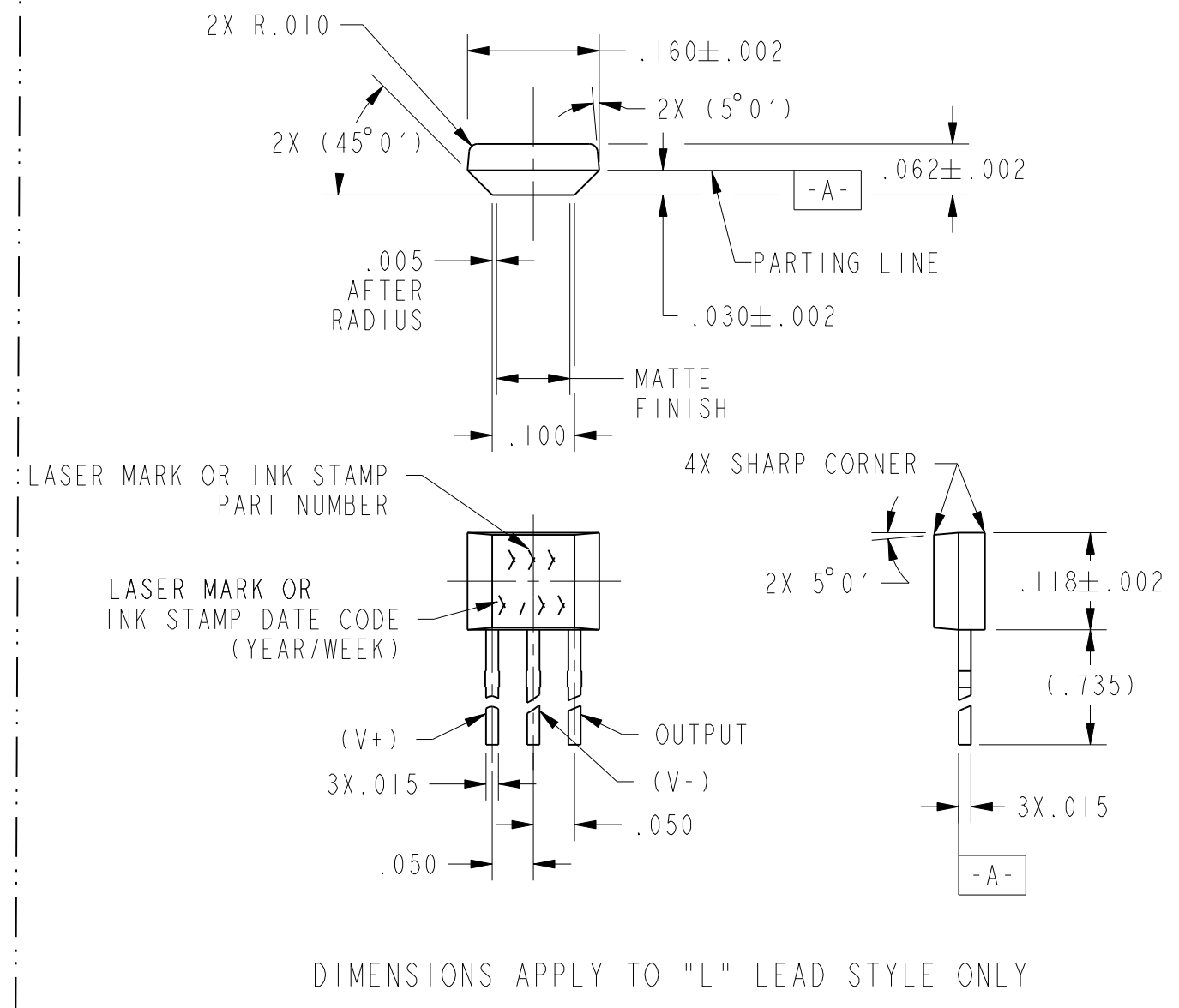
**NOTE:** Interruption of power to a latching device may cause the output to change state when power is restored. If a magnetic field of sufficient strength is present, the sensor output will be in the condition dictated by the magnetic field.

Product Specifications	
Product Type	Hall-Effect Digital Position Sensor IC
Package Quantity/Type	Available in 1,000/Bag
Package Style	Radial Lead IC
Supply Voltage	3.8 Vdc to 30.0 Vdc
Output Type	Sink
Termination Type	PC Board
Magnetic Actuation Type	Unipolar
Operating Temperature Range	-40 °C to 150 °C [-40 °F to 302 °F]
Storage Temperature	-65 °C to 160 °C [-85 °F to 320 °F]
Output Voltage	0.4 Vdc max.
Switching Time Rise (10 % to 90 %)	1.5 μs max.
Switching Time Fall (90 % to 10 %)	1.5 μs max.
Availability	Global
Supply Current (max. @ 25 °C)	10 mA
Output Current (max.)	20 mA
Operate Point @ 25 °C	18.0 mT [180 G] max.
Release Point @ 25 °C	7.5 mT [75 G] min.
Leakage Current max.	10 μA
Differential	0.5 mT [5 G] min.
Series Name	SS400

LEAD STYLES



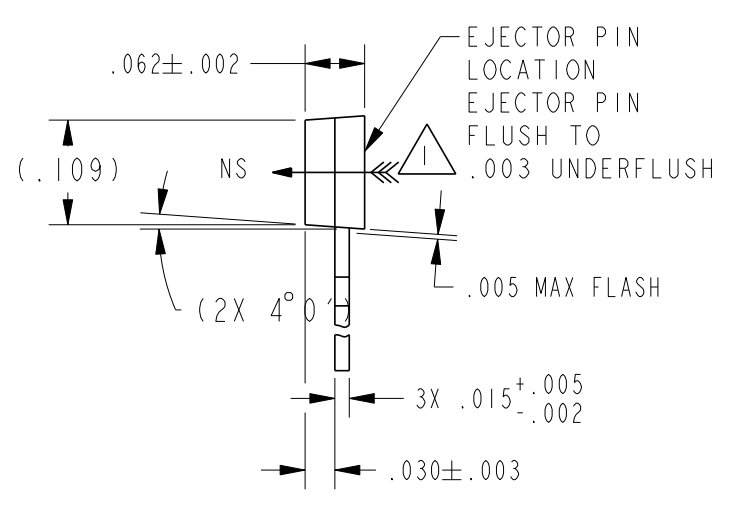
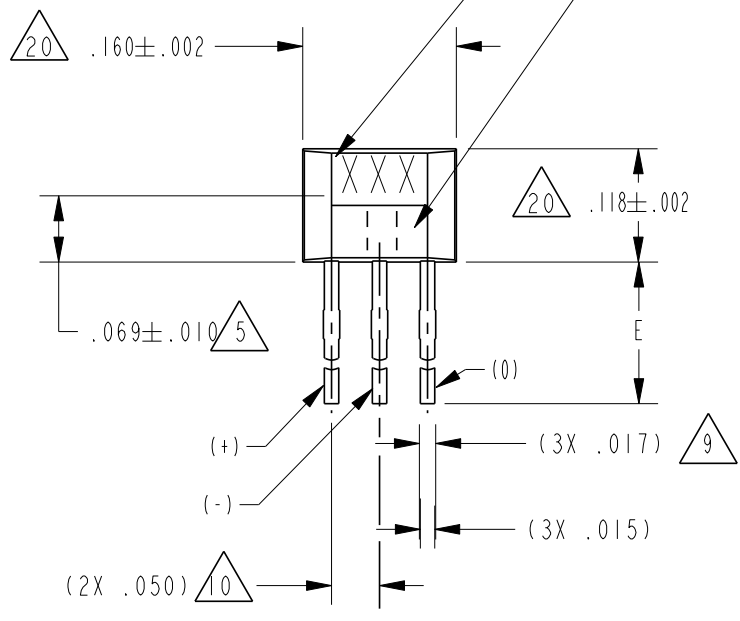
ALL EXCEPT "L" LEAD STYLES



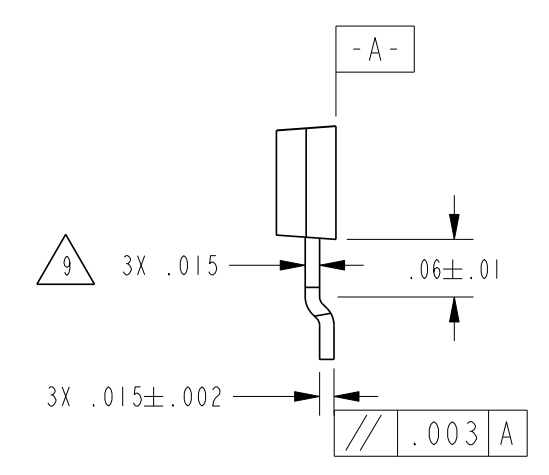
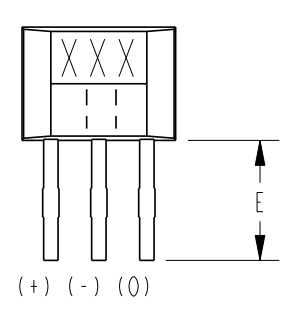
DIMENSIONS APPLY TO "L" LEAD STYLE ONLY

LASER MARK OR INK STAMP BRAND SYMBOL  
.039 HIGH CHARACTERS

LASER MARK OR INK STAMP DATE CODE  
( YEAR, WEEK ) .039 HIGH CHARACTERS ( 3 DIGITS )



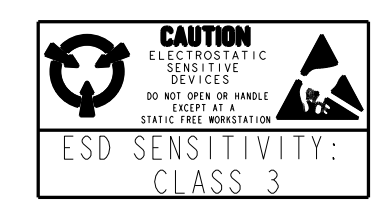
LEAD STYLES "STD", "R", "RP"



LEAD STYLES "S" & "SP"

NOTES

- 1 THE MAGNETIC FLUX USED TO OPERATE THE SWITCH MUST BE IN THE DIRECTION AND LOCATION SHOWN (THIS ASSUMES THE CONVENTION THAT THE DIRECTION OF THE EXTERNAL FLUX OF A MAGNET IS FROM THE NORTH TO THE SOUTH POLE OF THE MAGNET)
- 2 THE MAGNETIC FIELD STRENGTH (GAUSS) REQUIRED TO CAUSE THE SWITCH TO CHANGE STATE (OPERATE AND RELEASE) WILL BE AS TABULATED. TO TEST THE SWITCH AGAINST THE SPECIFIED LIMITS, THE SWITCH MUST BE PLACED IN A UNIFORM MAGNETIC FIELD
- 3 ABSOLUTE MAXIMUM RATINGS ARE THE EXTREME LIMITS THE DEVICE WILL MOMENTARILY WITHSTAND WITHOUT DAMAGE TO THE DEVICE. ELECTRICAL AND MAGNETIC CHARACTERISTICS ARE NOT GUARANTEED IF THE RATED VOLTAGE AND/OR CURRENTS ARE EXCEEDED NOR WILL THE DEVICE NECESSARILY OPERATE AT ABSOLUTE MAXIMUM RATINGS
- 4 TEST CONDITIONS:  $V_{CC}=12V$ ,  $R_2=1.6K$  OHMS,  $C_2=20pf$
- 5 APPROXIMATE HALL ELEMENT LOCATION
- 6 LEADS MUST BE ADEQUATELY SUPPORTED DURING ANY FORMING/SHEERING OPERATION TO ASSURE THAT THE LEADS ARE NOT STRESSED WITHIN THE PLASTIC
- 7 PCB WAVE SOLDERING GUIDELINES ARE AS FOLLOWS:  
250°C PEAK FOR 10 S MAX OR 260°C PEAK FOR 5S MAX  
SOLDERING TIME
- 8  $V_{CC}=12V$ ,  $R_1=1.6K$ ,  $C_1=20pf$
- 9 BURRS ARE ALLOWED ONLY IF FULL LENGTH OF LEADS WILL PASS THROUGH  $\varnothing.023$  HOLE. LEAD REFERENCE DIMENSIONS DO NOT INCLUDE SOLDER THICKNESS
- 10 DIMENSION REFERS TO THE LOCATION OF LEAD CENTERLINES AS THEY EXIT THE PLASTIC PACKAGE
- 11 TYPICAL DIMENSIONS NOT SHOWN IN LEAD STYLE "S" AND "SP"
- 12 SOME COMBINATIONS OF BASIC LISTING AND PACKING OPTIONS ARE NOT AVAILABLE
- 13 TAPE AND AMMOPACK PER EIA-468-A-1990
- 14 POCKET TAPE AND REEL PER EIA-481-A-1986
- 15  $V_{CC}=30V$ ,  $I_{sink}=20mA$ ,  $-40^{\circ}C < T < 150^{\circ}C$ , B>MAX OP GAUSS FOR SPECIFIC LISTING
- 16  $V_{CC}=3.8V$ ,  $I_{sink}=20mA$ , B>MAX OP GAUSS FOR SPECIFIC LISTING
- 17  $V_{out}=30V$ ,  $V_{CC}=24V$ , B<MIN RELEASE GAUSS FOR SPECIFIC LISTING
- 18 AMMOPACK STYLE "T2" AND "T3". 24 SWITCHES BETWEEN FOLDS, SKIP 1 SPACE AT FOLD. MAY BE REFERRED TO AS "FAN FOLD"
- 19 LEAD STRAIGHTNESS MAY BE DETERIORATED ON SOME UNITS BY BULK PACKAGING. APPLICATIONS HAVING A CRITICAL LEAD STRAIGHTNESS REQUIREMENT SHOULD USE A TAPE PACKAGING OPTION
- 20 MOLDED PART DIMENSIONS DO NOT INCLUDE FLASH. FLASH IS LIMITED TO .005 MAX
- 21 THESE HALL EFFECT SENSORS MAY HAVE AN INITIAL OUTPUT IN EITHER THE ON OR OFF STATE IF POWERED UP WITH AN APPLIED MAGNETIC FIELD IN THE DIFFERENTIAL ZONE (APPLIED MAGNETIC FIELD  $> B_{rp}$  AND  $< B_{op}$ ). MICRO SWITCH RECOMMENDS THAT THE APPLICATION CIRCUIT DESIGNER ALLOW 10 MICROSECONDS AFTER SUPPLY VOLTAGE HAS REACHED 5 VOLTS FOR THE OUTPUT VOLTAGE TO STABILIZE



THIRD ANGLE PROJECTION			
SCALE 5 : 1			
DO NOT SCALE PRINT			
TOLERANCES APPLY TO DESIGN UNITS. CONVERSIONS ARE ONLY FOR REFERENCE. UNLESS NOTED, TOLERANCES ARE :			
DIM	TOL	DIM	TOL
NO PLACES	X	1/2, 04	X.X
ONE PLACE	X.X	0.47, 016	X.XX
TWO PLACES	X.XX	0.157, 006	X.XXX
THREE PLACES	X.XXX		X.XXXX
ANGLES			
SI METRIC		US CUSTOMARY	
DESIGN UNITS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
WEIGHT			

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SOLID STATE SENSOR

SS400 SERIES CHART 1

ANSI Y14.5M-1982 APPLIES

FED. MFG. CODE 91929

CATALOG LISTING

SS400 SERIES CHART 1

ISSUE 16

REVISIONS

PTC/CAD 3D

GRT 26 MAR 02

SAV 26 MAR 02

26 OCT 07

RELEASE NO. PR-21345

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REPLACES



CATALOG LISTING  
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 RELEASE NO. PR-21345  
 REPLACES -

TABLE 1 - MAGNETIC AND ELECTRICAL SPECIFICATIONS  $\triangle 2 \triangle 21$

	-40°C	0°C	25°C	85°C	125°C	150°C
MIN OPERATE GAUSS						
SS411A	NS	NS	NS	NS	NS	NS
SS413A	NS	NS	NS	NS	NS	NS
SS441A	50	53	55	45	40	35
SS443A	110	110	110	90	80	65
SS449A	285	305	310	290	270	260
SS461A	5	5	10	10	5	5
SS466A	100	100	100	95	80	70
MAX OPERATE GAUSS						
SS411A	70	65	60	60	65	70
SS413A	140	140	140	140	140	140
SS441A	135	117	115	120	123	125
SS443A	215	190	180	180	190	200
SS449A	435	400	390	400	410	420
SS461A	110	90	85	85	100	110
SS466A	200	185	180	180	180	185
MIN RELEASE GAUSS						
SS411A	-70	-65	-60	-60	-65	-70
SS413A	-140	-140	-140	-140	-140	-140
SS441A	20	20	20	15	15	10
SS443A	80	80	75	70	60	55
SS449A	210	230	235	215	200	185
SS461A	-110	-90	-85	-85	-100	-110
SS466A	-200	-185	-180	-180	-100	-185
MAX RELEASE GAUSS						
SS411A	NS	NS	NS	NS	NS	NS
SS413A	NS	NS	NS	NS	NS	NS
SS441A	120	99	95	105	115	120
SS443A	190	165	155	165	180	195
SS449A	360	325	315	325	340	345
SS461A	-5	-5	-10	-10	-5	-5
SS466A	-100	-100	-100	-95	-80	-70
MIN DIFF GAUSS						
SS411A	15	15	15	12	12	10
SS413A	20	20	20	20	20	20
SS441A	15	15	20	15	8	5
SS443A	25	25	25	15	10	5
SS449A	30	30	30	30	30	30
SS461A	50	50	50	50	50	50
SS466A	200	200	200	190	160	140

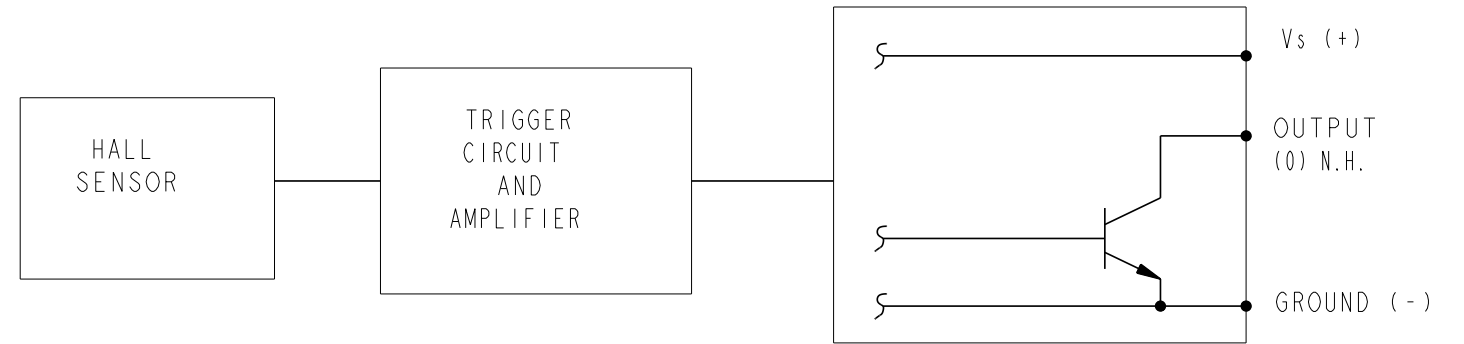


TABLE 2

PACKING	BAG
SPECIFIED VOLTAGE RANGE	3.8 - 30
MAX Ioff milliamp	15
MAX Ion milliamp	15
RATED SINK CURRENT Ma	20
MAX Vsat VOLTS	16
MAX LEAKAGE AT 24V, UA	17
RISE TIME AT 25°C 10% TO 90% $\mu$ S	4
FALL TIME AT 25°C 90% TO 10% $\mu$ S	4
STORAGE TEMP °C	-65 TO +160
OPERATING TEMP °C	-55 TO +160

TABLE 4

CATALOG LISTING	MAGNETIC TYPE	BRAND SYMBOL
SS411A	BIPOLAR	11A
SS413A	BIPOLAR	13A
SS441A	UNIPOLAR	41A
SS443A	UNIPOLAR	43A
SS449A	UNIPOLAR	49A
SS461A	LATCH	61A
SS466A	LATCH	66A

ABSOLUTE LIMITS  $\triangle 3$  TABLE 3

SUPPLY VOLTAGE	-1 TO +30
APPLIED OUTPUT VOLTAGE	-0.5 TO +30
OUTPUT CURRENT mA	SEE TABLE 5
MAGNETIC FLUX GAUSS	NO LIMIT

TABLE 5

OUTPUT CURRENT ABSOLUTE LIMITS	
SUPPLY VOLTAGE	OUTPUT CURRENT MAX, MA
-1 TO 24	50
24 TO 25	37
25 TO 26	33
26 TO 27	28
27 TO 28	24
28 TO 29	19
29 TO 30	15



THIRD ANGLE PROJECTION	
SCALE	NONE
DO NOT SCALE PRINT	
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE	
ONE PLACE (.0)	±.030
TWO PLACE (.00)	±.015
THREE PLACE (.000)	±.005
ANGLES	±
WEIGHT	

CATALOG LISTING  
**SS400 SERIES CHART 1**

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RELEASE NO. PR-21345

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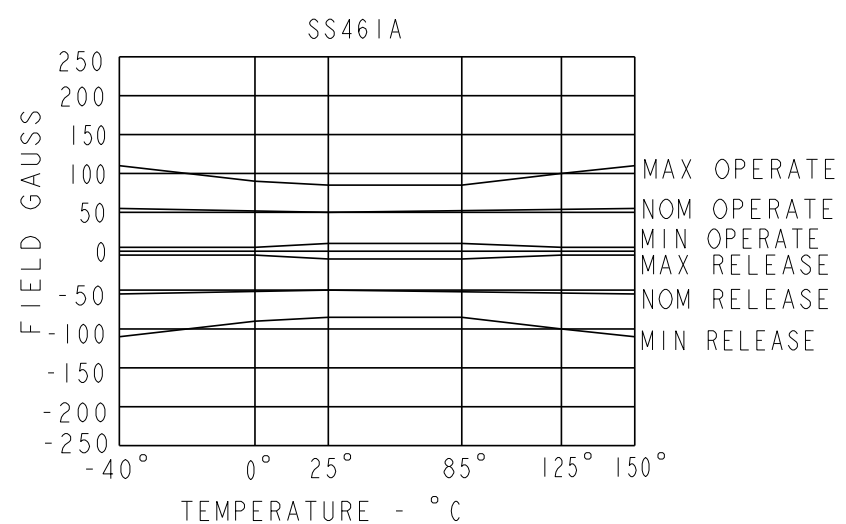
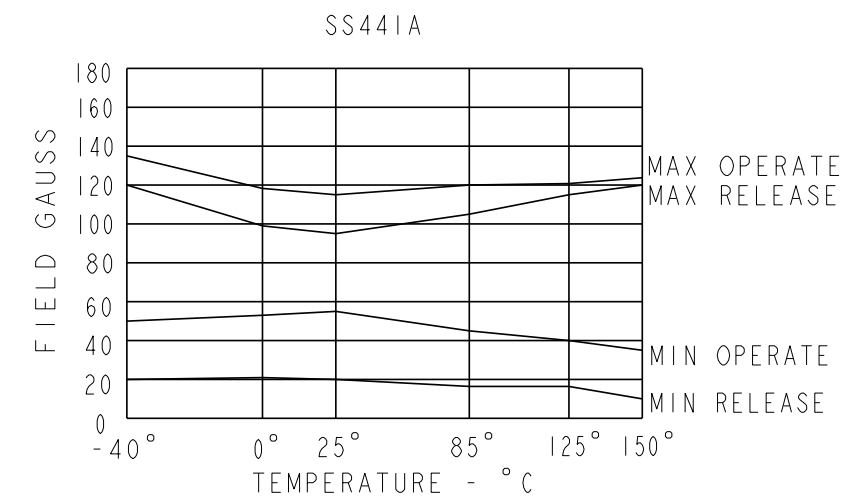
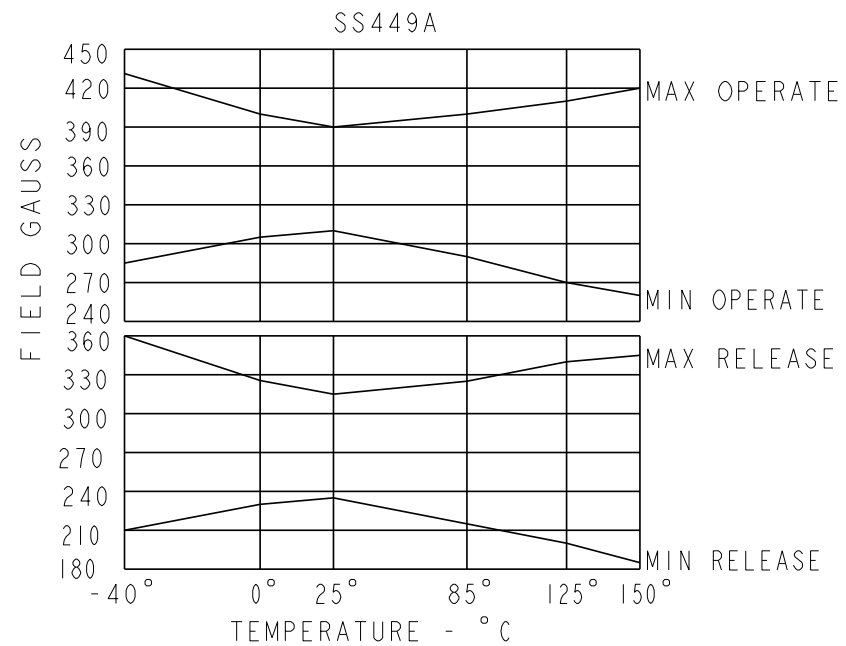
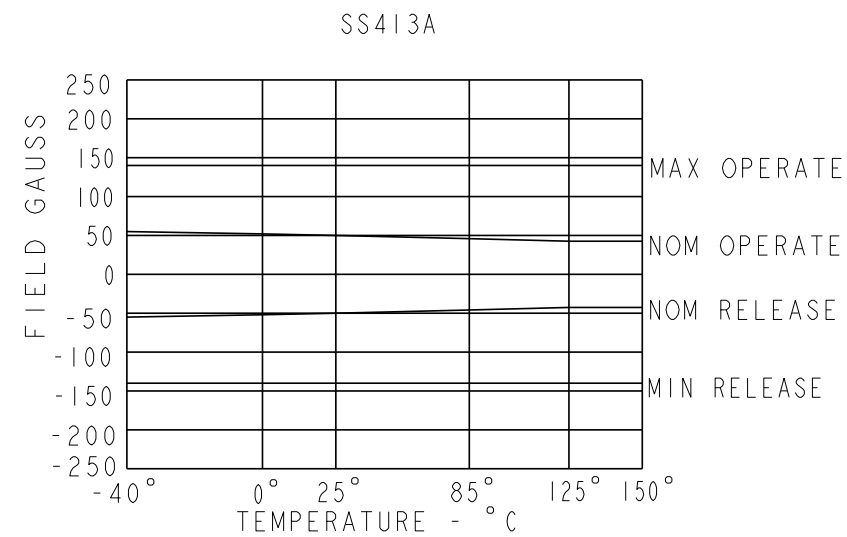
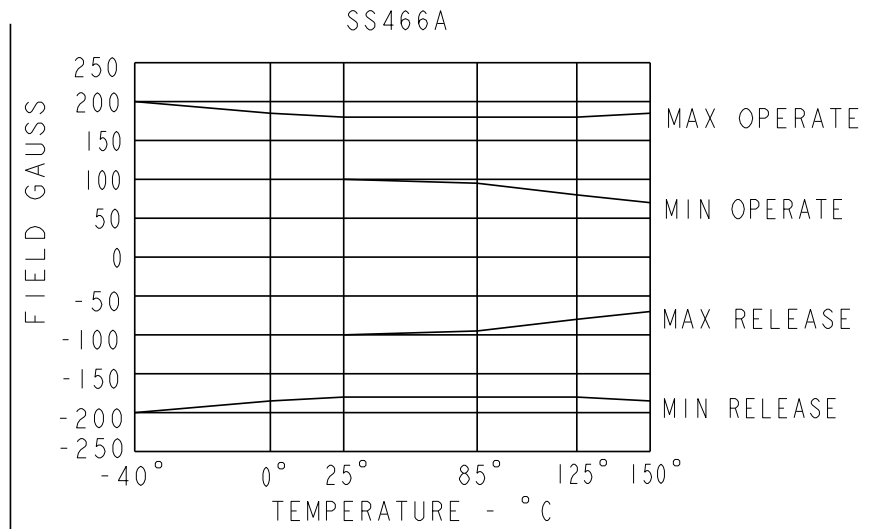
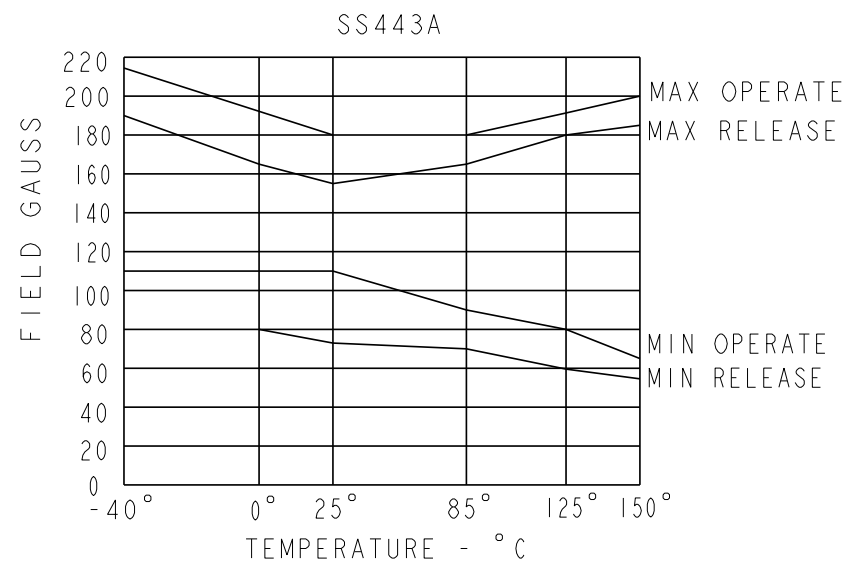
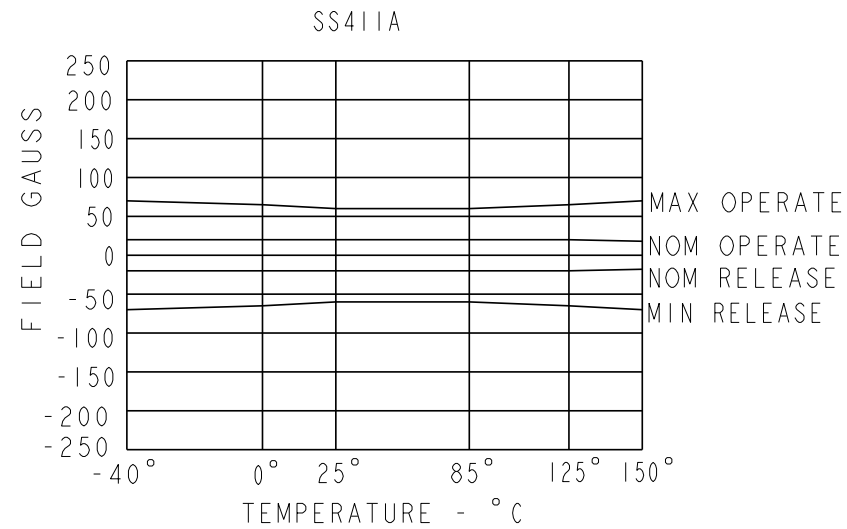
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**CAUTION**  
ELECTROSTATIC SENSITIVE DEVICES  
DO NOT OPEN OR HANDLE EXCEPT AT A STATIC FREE WORKSTATION

ESD SENSITIVITY:  
CLASS 3

THIRD ANGLE PROJECTION	
SCALE	NONE
DO NOT SCALE PRINT	
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE	
ONE PLACE	(.0) ±.030
TWO PLACE	(.00) ±.015
THREE PLACE	(.000) ±.005
ANGLES	±
WEIGHT	