Operating instruction manual OI/GP50-EN Rev. B

GP50
Vibrating Fork Level Switch

Vibrating level switch for powders and granular solids
K-TEK Products

Introduction

This operating instruction manual provides the following information:

– Mounting guidelines - see page 8
– Electrical connections/approvals - see page 10
– Switching logic - see page 12
– Adjustment and maintenance - see page 13

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1.0 INTRODUCTION

The GP50 is used for point-level monitoring in all types of containers and silos. It can be used with powdery and granulated bulk materials that do not have heavy buildup or deposits on the forks. A wide range of applications is also found in food manufacturing.

A selection of fields of application:

- Building materials industry (lime, styrofoam, moulding sand)
- Dry food manufacturing (milk powder, flour, salt)
- Plastics industry (plastic granules)
- Timber industry
- Chemical industry
- Mechanical engineering

FUNCTION

The piezo electrically stimulated probe vibrates at its natural resonance frequency of approximately 125 Hz. If the bulk material covers the probe, the damping thus generated is registered electronically and a corresponding signal output is actuated. The oscillation of the GP50 ensures that it features certain self-cleaning properties.

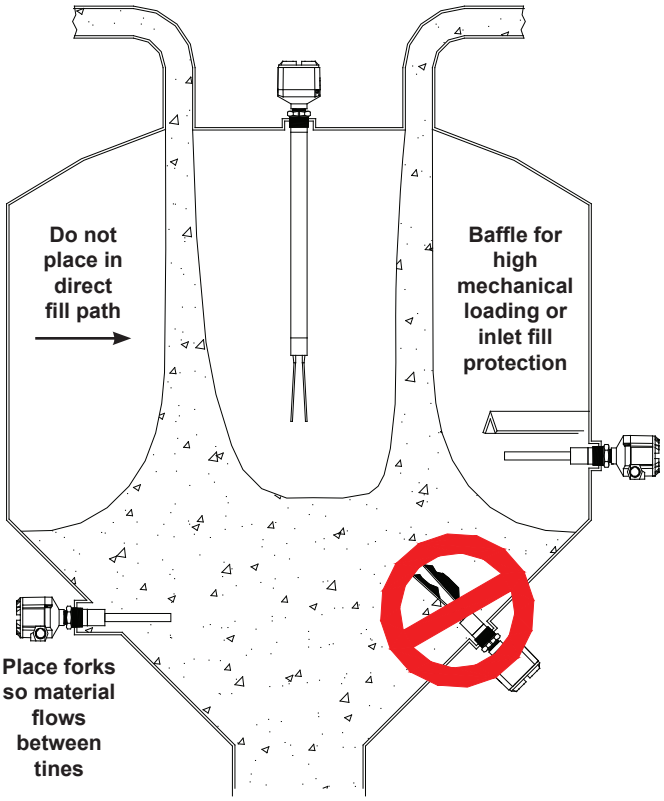
RANGE OF APPLICATION

The GP50 oscillating probe is normally screwed into the lateral container wall so that it is level with the filling height to be registered and monitored.

The GP50 can also be mounted onto the top side of the container and in this case an extension piece is used to mount the probe level with the height to be measured.

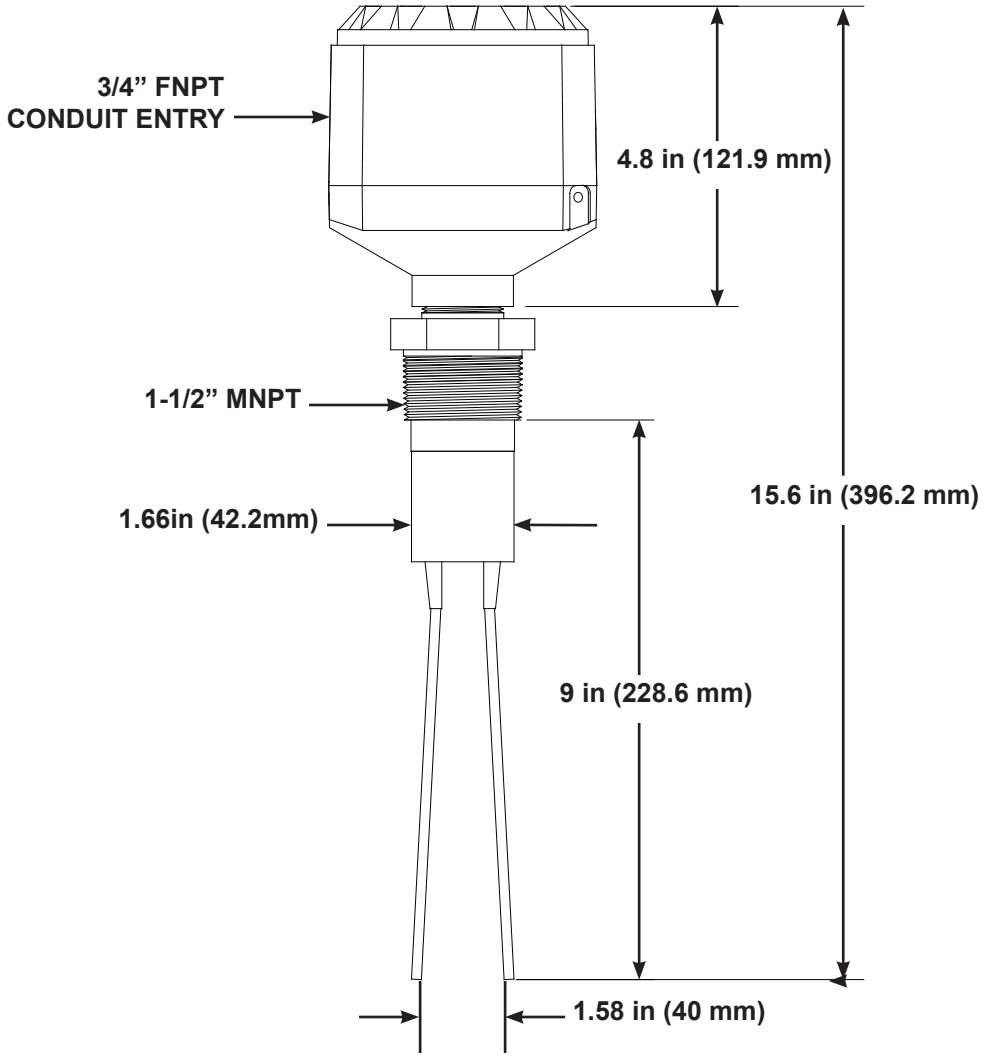
When replacing paddle type switches, a mounting plate accessory is used to allow for a direct drop-in replacement **(see page 09 for details).** The length of the probe can be up to 156 in. with an extension tube.

TYPICAL INSTALLATIONS



2.0 TECHNICAL DATA

GENERAL DIMENSIONS



MECHANICAL DATA

Enclosure:	Single compartment Cast aluminum Powder coated
Vibrating Fork	
Material:	316 stainless steel
Width Across:	1.58 in. (40mm)
Process Connection:	1 ½" MNPT
Oscillator	
Material:	Stainless steel
Surfaced Treatment of Vibrating Rods:	Polished
Overall Weight	
GP50 Std:	Approx. 3.53 lbs. (1.6 kg)
GP50 Ext:	Approx. 3.53 lbs. (1.6 kg) + about 1.69lbs/ft (2.5 kg/m) extension tube
Options	
Flange Connections:	Loose or welded flanges available
Mounting Plate:	For Rotary Paddle switch "drop in" replacement

(see page 10)

ELECTRICAL DATA

Supply Voltage:	19..253V 50-60Hz 19..60V DC universal voltage with relay output.
Installed Load:	Max. 1 VA (relay)
Electrical Connection:	¾" FNPT
Signal Output:	Universal voltage with relay-output Floating relay output: Max. AC 253V, 4A, 500W Max. DC 253V, 4A, 60W

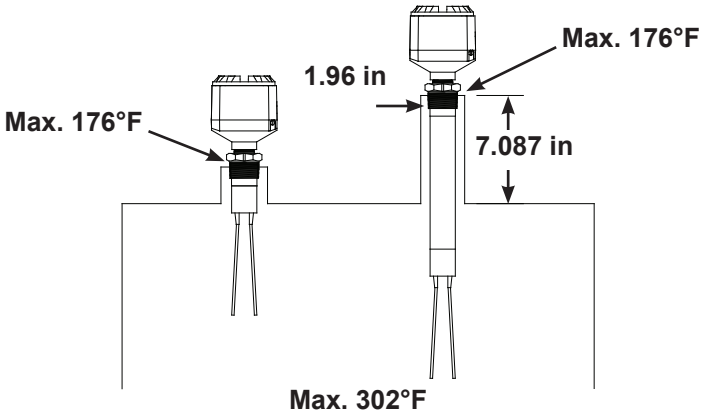
Switch Status Display:	By built-in LED
Signal Delay:	Probe free -> covered Approx. 1 sec. Prove covered -> free Approx. 1..2 sec.
Safety Operation:	To be switched over for (FSL, FSH) low / high level fail-to-safe
Sensitivity:	Adjustable to two levels
Measuring Frequency:	Approx. 125Hz
Isolating:	Supply voltage to signal output 3kV~
Protection Class:	I

OPERATING CONDITIONS

Ambient Temperature at the Housing:	-13ºF to 140ºF / -25ºC to 60ºC
Internal Temperature of the Container:	-13ºF to 302º F / -25ºC to 150ºC
Min. Powder Density:	Approx. 1.3 pcf (20 g/l)
Features of Bulk Materials:	No strong propensity to cake or deposit Max. grain size .40 in (10 mm)
Max. Oscillator Load:	Max. 135 ft-lb (600N) laterally (on oscillating rods)
Max. Torque:	221 ft-lb (300 NM
Max. Tensile Force:	449.6 ft-lb (2 Kn)
Max. Container Pressure:	230 psi (16 bar)
Protective Measures in Case of High Loading:	Mounting of a protective baffle above the probe

Mounting in container with 302ºF/ 150ºC:

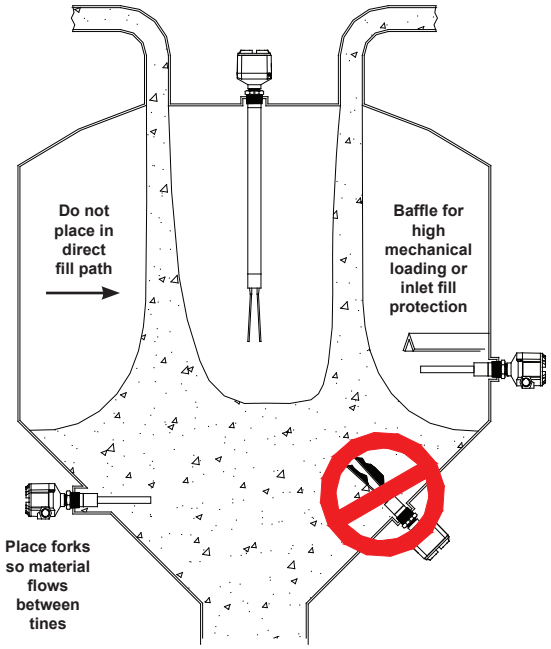
Maximum ambient temperature at the housing -13ºF to 140ºF



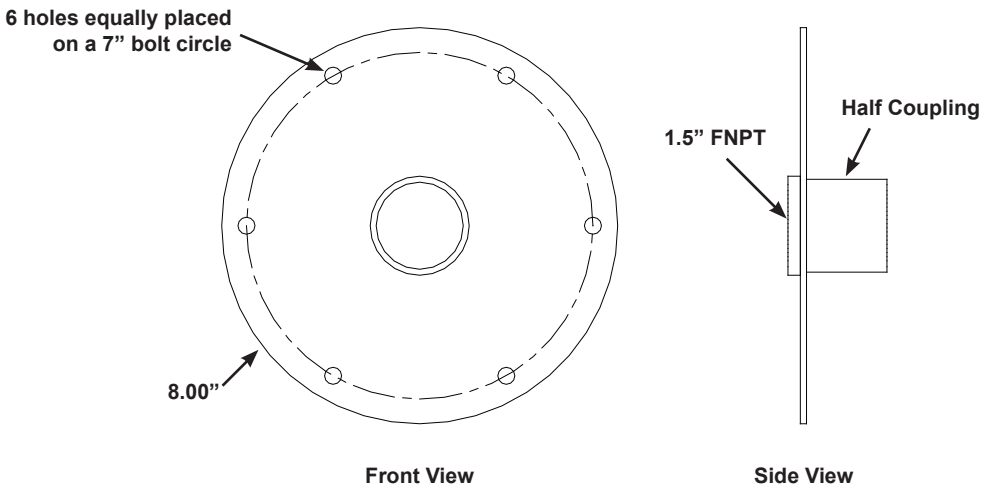
Installation of the GP50 in the socket:
The socket has to be high enough, so that the maximum surface Temperature at the thread part on the housing is 176°F.

3.0 MOUNTING

Flange Mounting: A plastic sealant must be used to tighten the flange



MP6 Mounting Plate Detail
Required for Paddle Switch Replacement

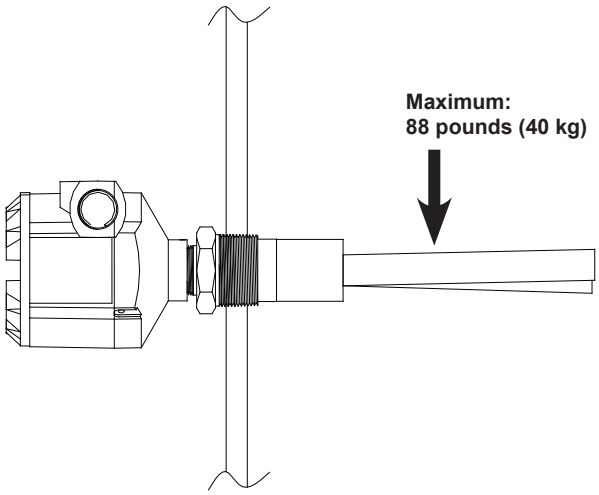


Note: For paddle switch replacements, use the SF/MP6 mounting plate for installation.

TIPS FOR INSTALLATION

Switch Point:	Heavy bulk material → cover of ~ 1/4” Light bulk material → cover of ~ 3/4”
Oscillating Fork:	Do not bend, shorten or extend the oscillating rods since this will destroy the GP50.
Screwing the GP50 In:	Use a 50mm open-end wrench (do not turn the housing).
Agitated/Mixing Applications:	In the case of strong lateral loads, check whether the GP50 could be installed laterally instead of mounting from the top with a long extension piece (GP50 EXT).

The Maximum Downward Force on the Fork Assembly Can Be Derived by:

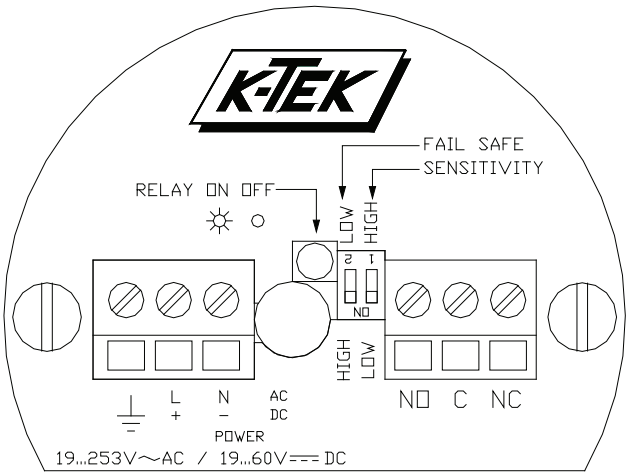


- Make sure that the boots for protecting cable terminations are not longer than .314 in. (danger of contact with live parts).
- Make sure that the screwed cable gland safely seals the cable and that it is tight (danger of water intrusion).
- A voltage-disconnecting switch must be provided near the GP50.
- In the case of a defect, the distribution voltage must automatically be cut off by a FI protective switch so as to protect the user of the GP50 from indirect contact with dangerous electric tensions.
- In the case of non-ensure handling or handling malpractice, the electric safety of the GP50 cannot be guaranteed.
- Switch off the supply voltage before opening the GP50.
- Before opening the lid, take care that no dust deposits or whirlings are present.

APPROVALS

CE	EMV	EN61326/A1
	Security	EN61010-1

GP50 ELECTRICAL CONNECTIONS



5.0 SWITCHING LOGIC

Low / High Level Fail-to-Safe
If the probe is used to indicate full load:

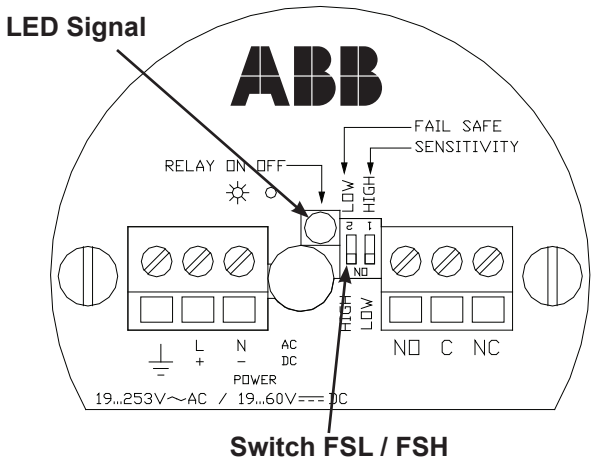
→ set to maximum-security level FSH

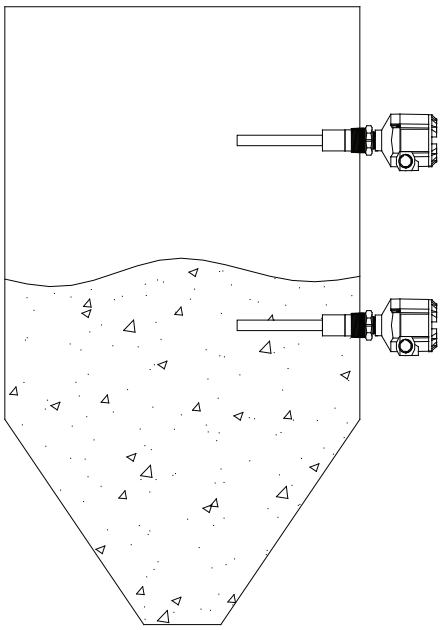
Power failure or line break is regarded as "full" signal (protection against overcharging).

If the probe is used to indicate empty load:

→ set to minimum-security level FSL

Power failure or line break is regarded as "empty" signal (protection against running dry).





FSL	FSH	
3 4 5 7 8 9	3 4 5 7 8 9	relay output
1 3	1 3	transistor output
⊗	⊗	LED "signal"

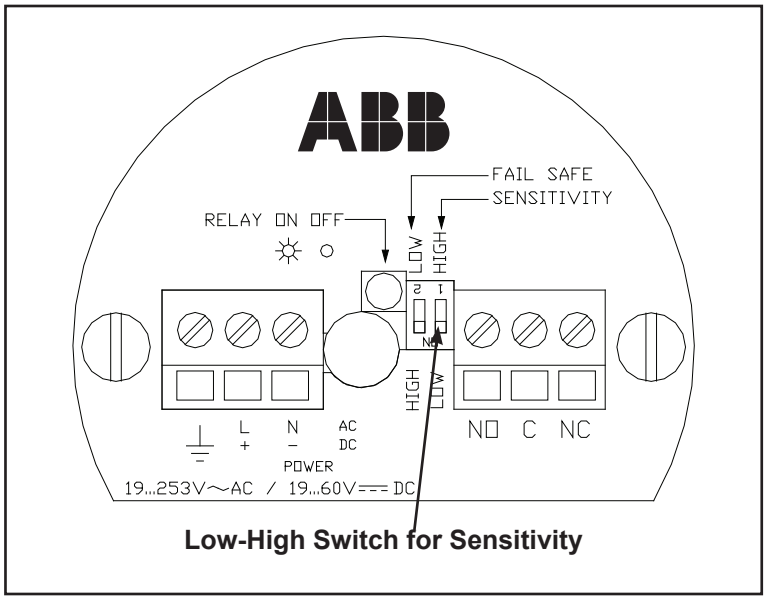
3 4 5 7 8 9	3 4 5 7 8 9	relay output
1 3	1 3	transistor output
⊗	⊗	LED "signal"

6.0 ADJUSTMENT / MAINTENANCE

ADJUSTMENT

Adjustment - Sensitivity

All probes have a factory default (factory default = position “high”). Therefore, they usually do not have to be re-adjusted for increased sensitivity. However, if the bulk material has a strong propensity to cake or deposit, the adjustment switch can be set to position “low” so as to decrease the sensitivity of the probe (Factory default = position “high”).



Low-High Switch for Sensitivity

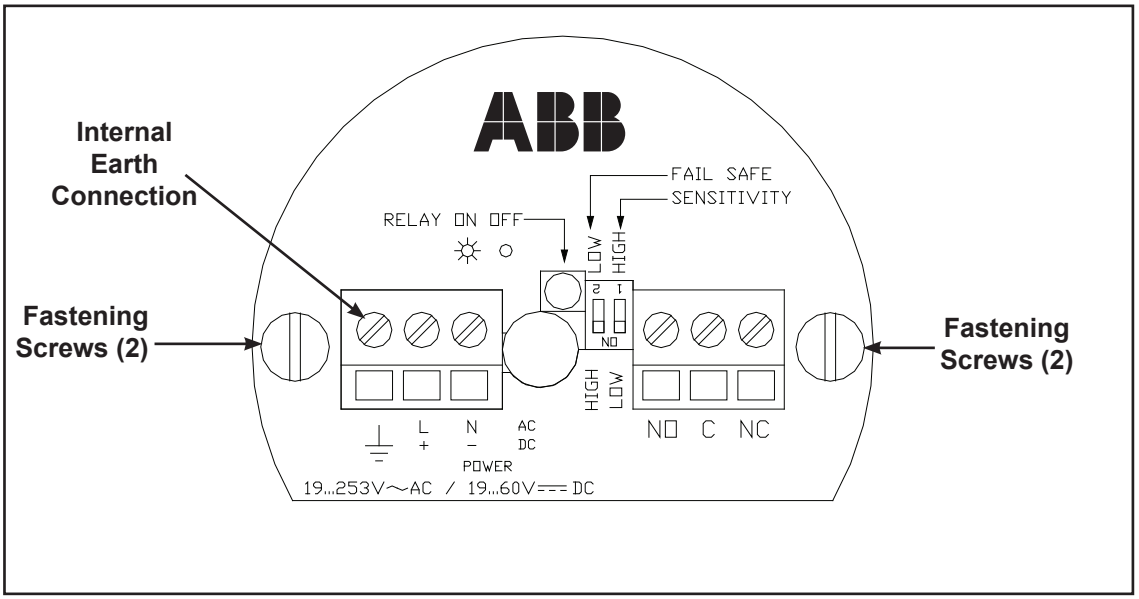
MAINTENANCE

Normally, the GP50 requires no maintenance. However, depending on the individual field of application, the following should be observed and inspected:

- mechanically damaged oscillating rods
- coarse cleaning of the oscillating rods

Changing the Electronic Module

1. Open the housing lid, remove the pigtails from the GP50.
2. Disconnect internal wire for earth connection from terminal PE (not at electronic module 2-wire).
3. Unscrew two fastening screws of the electronic module.
4. Pull out electronic module.
5. Insert new electronic module (until it locks into place).
6. Fix internal wire for earth connection to terminal and screw down the fastening screws.
7. Connect the pigtails to the GP50.



7.0 WARRANTY

5 YEAR WARRANTY FOR:
KM26 Magnetic Liquid Level Gauges, Buoyancy Level Switches (LS20, MS50, MS10 & MS8), Magnetic Level Switches (MS30, MS21, MS40, MS41, PS35 & PS45), EC External Chambers and ST95 Seal Pots.

3 YEAR WARRANTY FOR:
KCAP300 & KCAP 400 capacitance switches.

2 YEAR WARRANTY FOR:
AT100 and AT200 series transmitters; VF20 and VF30 vibrating fork switches; RLT100 and RLT200 reed switch level transmitters; TX, TS, TQ, IX and IM thermal dispersion switches; IR10 and PP10 External Relays; MT2000 radar level transmitters; KP paddle switches; A02, A75 & A77 RF capacitance level switches and A38 RF capacitance level transmitters.

1 YEAR WARRANTY FOR:
KM50 gauging device; AT500 and AT600 series transmitters; LaserM and SureShot series laser transmitters; LPM 100 and 200 series digital indicators; DPM100 digital indicators; APM100 analog indicators; KVIEW series digital indicators and controllers; GP50 and SF60 vibrating fork switches, KB Electro-Mechanical Continuous Measuring Devices, KSONIK ultrasonic level switches, transmitters & transducers.

SPECIAL WARRANTY CONSIDERATIONS:
ABB does not honor OEM warranties for items not manufactured by ABB (i.e. Palm Pilots). These claims should be handled directly with the OEM.

ABB will repair or replace, at ABB's election, defective items which are returned to ABB by the original purchaser within the period specified above from the **shipment date** of the item and which is found, upon examination by ABB, to its satisfaction, to contain defects in materials or workmanship which arose only under normal use and service and which were not the result of either alterations, misuse, abuse, improper or inadequate adjustments, applications or servicing of the product. **ABB's warranty does not include onsite repair or services.** Field service rates can be supplied on request.

If a product is believed to be defective, the original purchaser shall notify ABB and request a Returned Material Authorization before returning the material to ABB, with transportation **prepaid** by the purchaser. (Request door to door delivery via New Orleans International Airport located in Louisiana, USA.) The product, with repaired or replaced parts, shall be returned to the purchaser at any point in the world with transportation prepaid by ABB for best-way transportation only. ABB is not responsible for expedited shipping charges. If the product is shipped to ABB freight collect, then it will be returned to the customer freight collect.

If inspection by ABB does not disclose any defects in material or workmanship, ABB's normal charges for repair and shipment shall apply (minimum 100.00 USD).

The materials of construction for all ABB products are clearly specified and it is the responsibility of the purchaser to determine the compatibility of the materials for the application.

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