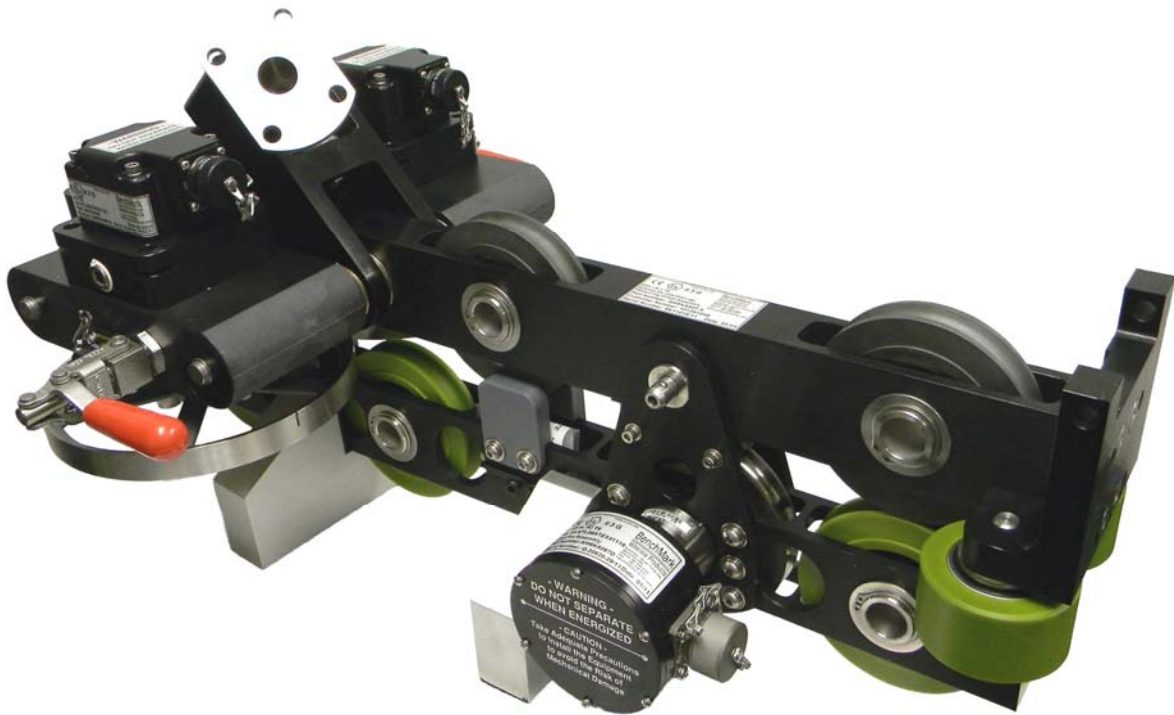


## **AM5K COMBINED DEPTH/TENSION MEASUREMENT DEVICE**

**For Open & Cased Hole or  
Cased Hole E-Line Logging**

STANDARD CONFIGURATIONS



# BenchMark Wireline - AM5K Item Matrix - Sorted by Item Number

Item P/N	Description	Encoder Quantity	PPR	Encoder P/N	Load Pin Type	LP P/N	MMD y/n
AMBK.A501	DEVICE CABLE MSRPMT 2 FT TANGENT	1	512/80PPR	AMBK.P63	0-15V TENSION	AMBK.A069C	Y
AMBK.A502	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200PPR	AMBK.P61	2mVv TENSION	AMBK.A013	Y
AMBK.A506	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	Y
AMBK.A507	DEVICE CABLE MSRPMT EEA NA IMMD	2	1200PPR	AMBK.A068B	2mVv TENSION	AMBK.A067D	Y
AMBK.A507A	DEVICE CABLE MSRPMT EEA NA IMMD	2	1200PPR	AMBK.A068B	2mVv TENSION	AMBK.A067D	Y
AMBK.A509	DEVICE CABLE MSRPMT 2 FT TANGENT	1	512/80PPR	AMBK.P63	0-15V TENSION	AMBK.A069C	N
AMBK.A510	DEVICE CABLE MSRPMT EEA NA OH	2	1200PPR	AMBK.A074	0-15V TENSION	AMBK.A069C	Y
AMBK.A510A	DEVICE CABLE MSRPMT EEA NA	2	1200PPR	AMBK.A068B	0-15V TENSION	AMBK.A069C	Y
AMBK.A510B	DEVICE CABLE MSRPMT EEA NA	2	1200PPR	AMBK.A074	0-15V TENSION	AMBK.A069C	Y
AMBK.A512	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200PPR	AMBK.P61	2mVv TENSION	AMBK.A013	N
AMBK.A513	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200PPR	AMSL.P061	2mVv TENSION	AMBK.A313B	N
AMBK.A514	DEVICE BRAID LINE MSRPMT 2 FT TANGENT	1	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	N
AMBK.A515	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	N
AMBK.A515-650	DEVICE CABLE MSRPMT 650 WHEELS	2	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	N
AMBK.A515-650	DEVICE CABLE MSRPMT 650 WHEELS	2	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	N
AMBK.A516	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	N
AMBK.A517	DEVICE CABLE MSRPMT EEA NA	2	512/80PPR	AMBK.A070B	0-15V TENSION	AMBK.A069C	Y
AMBK.A517A	DEVICE CABLE MSRPMT EEA NA IMMD	2	512/80PPR	AMBK.A070B	0-15V TENSION	AMBK.A069C	Y
AMBK.A518	DEVICE CABLE MSRPMT 2 FT TANGENT	2	512/80PPR	AMBK.P63	0-15V TENSION	AMBK.A069C	Y
AMBK.A519	DEVICE CABLE MSRPMT 2 FT TANGENT	0	NO ENCODER	0	2mVv TENSION	AMBK.A071	N
AMBK.A520	DEVICE CABLE MSRPMT 2 FT WHEEL	1	1200PPR	AMSL.P061	4-20MA TENSION	AMBK.A420	N
AMBK.A521A-1	DEVICE CABLE MSRPMT EEA NA	2	1200PPR	AMBK.A079B	2mVv TENSION	AMBK.A573A	Y
AMBK.A521A-2	DEVICE CABLE MSRPMT EEA NA	1	600PPR	AMSL.P91	2mVv TENSION	AMBK.A573A	N
AMBK.A522A	DEVICE CABLE MSRPMT ZONE 1	1	1200PPR	AMBK.P64	2mVv TENSION	AMBK.A078	N
AMBK.A522A-1	DEVICE CABLE MSRPMT ZONE 1	1	1200PPR	AMBK.P64	2mVv TENSION	AMBK.A078	N
AMBK.A522B-2	DEVICE CABLE MSRPMT ZONE 1	1	1200PPR	AMBK.P64	2mVv PASSIVE	AMBK.A078	Y
AMBK.A522B-3	DEVICE CABLE MSRPMT ZONE 1	0	NO ENCODER	0	2mVv PASSIVE	AMBK.A573A	N
AMBK.A523	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200PPR	AMSL.P061	0-15V TENSION	AMBK.A069C	Y
AMBK.A524	DEVICE CABLE MSRPMT 2 FT CH	2	1200PPR	AMBK.P92	2mVv TENSION	AMBK.A013	N
AMBK.A525	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200PPR	AMSL.P061	4-20MA TENSION	AMBK.A420	Y
AMBK.A526	DEVICE CABLE MSRPMT 2 FT WHEEL	1	600PPR	AMSL.P061	4-20MA TENSION	AMBK.A420	N
AMBK.A527A	DEVICE CABLE MSRPMT EEA NA IMMD	2	1200PPR	AMBK.A060B	2mVv TENSION	AMBK.A087B	Y
AMBK.A527A-1	DEVICE CABLE MSRPMT EEA NA IMMD	2	1200BLU	AMBK.A060B	2mVv TENSION	AMBK.A087B	Y
AMBK.A528	DEVICE CABLE MSRPMT 2 FT TANGENT	2	512/80PPR	AMBK.P63	0-15V TENSION	AMBK.A069C	N
AMBK.A529	DEVICE CABLE MSRPMT EEA NA CH	2	1200PPR	AMBK.A068B	2mVv TENSION	AMBK.A067D	N
AMBK.A529A	DEVICE CABLE MSRPMT EEA NA CH	1	1200PPR	AMBK.A068B	2mVv TENSION	AMBK.A067D	N
AMBK.A530	DEVICE CABLE MSRPMT 2 FT TANGENT	2	120PPR	AMBK.P61	4-20mA TENSION	AMBK.A420	M
AMBK.A532	DEVICE CABLE MSRPMT 0-15V TEN	1	300PPR	AMBK.P89	0-15V TENSION	AMBK.A069C	N
AMBK.A534	DEVICE CABLE MSRPMT 2 FT WHEEL	2	300PPR	AMBK.P89	4-20MA TENSION	AMBK.A420	N
AMBK.A535	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200PPR	AMBK.P92	4-20MA TENSION	AMBK.A420	N
AMBK.A535-1	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200PPR	AMBK.P92	4-20MA TENSION	AMBK.A420	N
AMBK.A536	DEVICE CABLE MSRPMT 2 FT TANGENT	2	300PPR	AMBK.P89	0-15V TENSION	AMBK.A069C	Y
AMBK.A537	DEVICE CABLE MSRPMT 2 FT TANGENT	1	300PPR	AMBK.P89	0-15V TENSION	AMBK.A069C	N
AMBK.A538	DEVICE BRAID LINE MSRPMT 2 FT TANGENT	0	NO ENCODER	0	NO LOAD PIN	0	N
AMBK.A539	DEVICE CABLE MSRPMT CH Z2	2	1200PPR	AMBK.A079B	2mVv NDN AMP	AMBK.P103	Y
AMBK.A547	DEVICE CABLE MSRPMT OHCH	2	1200PPR	AMBK.P88	2mVv NDN AMP	AMBK.P103	Y
AMBK.A549	DEVICE CABLE MSRPMT CH	2	1200PPR	AMBK.P88	2mVv NDN AMP	AMBK.P103	N

The AMTK.A010 is now replaced by AM5K.A069C

**BenchMark Wireline - AM5K Item Matrix - Sorted by Encoder P/N**

Item P/N	Description	Encoder Quantity	PPR	Encoder P/N	Load Pin Type	LP P/N	MMD y/n
AM5K.A519	DEVICE CABLE MSRPMT 2 FT TANGENT	0	NO ENCODER	0	2m/yv TENSION	AM5K.A071	N
AM5K.A522B-3	DEVICE CABLE MSRPMT ZONE 1	0	NO ENCODER	0	2m/yv PASSIVE	AM5K.A573A	N
AM5K.A538	DEVICE BRAID LINE MSRPMT 2 FT TANGENT	0	NO ENCODER	0	NO LOAD PIN	0	N
AM5K.A530	DEVICE CABLE MSRPMT 2 FT TANGENT	2	120 PPR	AM5K.P161	4-20mA TENSION	AM5K.A4420	M
AM5K.A507	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200 PPR	AM5K.A068B	2m/yv TENSION	AM5K.A067D	Y
AM5K.A507A	DEVICE CABLE MSRPMT EER NA MMID	2	1200 PPR	AM5K.A068B	2m/yv TENSION	AM5K.A067D	Y
AM5K.A500A	DEVICE CABLE MSRPMT EER NA	2	1200 PPR	AM5K.A068B	0-15v TENSION	AM5K.A069C	Y
AM5K.A529	DEVICE CABLE MSRPMT EER NA CH	2	1200 PPR	AM5K.A068B	2m/yv TENSION	AM5K.A067D	N
AM5K.A529A	DEVICE CABLE MSRPMT EER NA CH	1	1200 PPR	AM5K.A068B	2m/yv TENSION	AM5K.A067D	N
AM5K.A517	DEVICE CABLE MSRPMT EER NA	2	512/780 PPR	AM5K.A070B	0-15v TENSION	AM5K.A069C	Y
AM5K.A57A	DEVICE CABLE MSRPMT EER NA MMID	2	512/780 PPR	AM5K.A070B	0-15v TENSION	AM5K.A069C	Y
AM5K.A510	DEVICE CABLE MSRPMT EER NA OH	2	1200 PPR	AM5K.A074	0-15v TENSION	AM5K.A069C	Y
AM5K.A50B	DEVICE CABLE MSRPMT EER NA	2	1200 PPR	AM5K.A074	0-15v TENSION	AM5K.A069C	Y
AM5K.A521A-1	DEVICE CABLE MSRPMT EER NA	2	1200 PPR	AM5K.A078B	2m/yv TENSION	AM5K.A573A	Y
AM5K.A539	DEVICE CABLE MSRPMT CH Z2	2	1200 PPR	AM5K.A078B	2m/yv NON AMP	AM5K.P103	N
AM5K.A527A	DEVICE CABLE MSRPMT EER NA MMID	2	1200 PPR	AM5K.A080B	2m/yv TENSION	AM5K.A087B	Y
AM5K.A527A-1	DEVICE CABLE MSRPMT EER NA MMID	2	1200 BLU	AM5K.A080B	2m/yv TENSION	AM5K.A087B	Y
AM5K.A502	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200 PPR	AM5K.P161	2m/yv TENSION	AM5K.A013	Y
AM5K.A512	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200 PPR	AM5K.P161	2m/yv TENSION	AM5K.A013	N
AM5K.A501	DEVICE CABLE MSRPMT 2 FT TANGENT	1	512/780 PPR	AM5K.P163	0-15v TENSION	AM5K.A069C	Y
AM5K.A509	DEVICE CABLE MSRPMT 2 FT TANGENT	1	512/780 PPR	AM5K.P163	0-15v TENSION	AM5K.A069C	N
AM5K.A518	DEVICE CABLE MSRPMT 2 FT TANGENT	2	512/780 PPR	AM5K.P163	0-15v TENSION	AM5K.A069C	Y
AM5K.A528	DEVICE CABLE MSRPMT 2 FT TANGENT	2	512/780 PPR	AM5K.P163	0-15v TENSION	AM5K.A069C	N
AM5K.A522A	DEVICE CABLE MSRPMT ZONE 1	1	1200 PPR	AM5K.P164	2m/yv TENSION	AM5K.A078	N
AM5K.A522A-1	DEVICE CABLE MSRPMT ZONE 1	1	1200 PPR	AM5K.P164	2m/yv TENSION	AM5K.A078	N
AM5K.A522B-2	DEVICE CABLE MSRPMT ZONE 1	1	1200 PPR	AM5K.P164	2m/yv PASSIVE	AM5K.A078	Y
AM5K.A547	DEVICE CABLE MSRPMT OH/CH	2	1200 PPR	AM5K.P188	2m/yv NON AMP	AM5K.P103	Y
AM5K.A549	DEVICE CABLE MSRPMT CH	2	1200 PPR	AM5K.P188	2m/yv NON AMP	AM5K.P103	N
AM5K.A532	DEVICE CABLE MSRPMT 0-15v TEN	1	300 PPR	AM5K.P189	0-15v TENSION	AM5K.A069C	N
AM5K.A534	DEVICE CABLE MSRPMT 2 FT WHEEL	2	300 PPR	AM5K.P189	4-20mA TENSION	AM5K.A4420	N
AM5K.A536	DEVICE CABLE MSRPMT 2 FT TANGENT	2	300 PPR	AM5K.P189	0-15v TENSION	AM5K.A069C	Y
AM5K.A537	DEVICE CABLE MSRPMT 2 FT TANGENT	1	300 PPR	AM5K.P189	0-15v TENSION	AM5K.A069C	N
AM5K.A524	DEVICE CABLE MSRPMT 2 FT CH	2	1200 PPR	AM5K.P182	2m/yv TENSION	AM5K.A013	N
AM5K.A535	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200 PPR	AM5K.P182	4-20mA TENSION	AM5K.A4420	N
AM5K.A535-1	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200 PPR	AM5K.P182	4-20mA TENSION	AM5K.A4420	N
AM5K.A521A-2	DEVICE CABLE MSRPMT EER NA	1	600 PPR	AM5K.P191	2m/yv TENSION	AM5K.A573A	N
AM5K.A506	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	Y
AM5K.A513	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200 PPR	AM5K.P061	2m/yv TENSION	AM5K.A318B	N
AM5K.A514	DEVICE BRAID LINE MSRPMT 2 FT TANGENT	1	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	N
AM5K.A515	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	N
AM5K.A515-550	DEVICE CABLE MSRPMT 550 WHEELS	2	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	N
AM5K.A515-650	DEVICE CABLE MSRPMT 650 WHEELS	2	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	N
AM5K.A516	DEVICE CABLE MSRPMT 2 FT TANGENT	1	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	N
AM5K.A520	DEVICE CABLE MSRPMT 2 FT WHEEL	1	1200 PPR	AM5K.P061	4-20mA TENSION	AM5K.A4420	N
AM5K.A523	DEVICE CABLE MSRPMT 2 FT TANGENT	2	1200 PPR	AM5K.P061	0-15v TENSION	AM5K.A069C	Y
AM5K.A525	DEVICE CABLE MSRPMT 2 FT WHEEL	2	1200 PPR	AM5K.P061	4-20mA TENSION	AM5K.A4420	Y
AM5K.A526	DEVICE CABLE MSRPMT 2 FT WHEEL	1	600 PPR	AM5K.P061	4-20mA TENSION	AM5K.A4420	N

The AM5K.A010 is now replaced by AM5K.A069C

**BenchMark Wireline - AM5K Item Matrix - Sorted by LP P/N**

Item P/N	Description	Encoder Quantity	PPR	Encoder P/N	Load Pin Type	LP P/N	MMD y/n
AM5KA538	DEVICE BRAID LINE MSRMT 2 FT TANGENT	0	NO ENCODER	0	NO LOAD PIN	0	N
AM5KA502	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KP161	2mV/V TENSION	AM5KA013	Y
AM5KA512	DEVICE CABLE MSRMT 2 FT TANGENT	1	1200PPR	AM5KP161	2mV/V TENSION	AM5KA013	N
AM5KA524	DEVICE CABLE MSRMT 2 FT CH	2	1200PPR	AM5KP192	2mV/V TENSION	AM5KA013	N
AM5KA507	DEVICE CABLE MSRMT 2 FT CH	2	1200PPR	AM5KA068B	2mV/V TENSION	AM5KA067D	Y
AM5KA507A	DEVICE CABLE MSRMT 2 FT CH	2	1200PPR	AM5KA068B	2mV/V TENSION	AM5KA067D	Y
AM5KA529	DEVICE CABLE MSRMT 2 FT CH	2	1200PPR	AM5KA068B	2mV/V TENSION	AM5KA067D	N
AM5KA529A	DEVICE CABLE MSRMT 2 FT CH	1	1200PPR	AM5KA068B	2mV/V TENSION	AM5KA067D	N
AM5KA501	DEVICE CABLE MSRMT 2 FT TANGENT	1	512/80PPR	AM5KP163	0.15V TENSION	AM5KA069C	Y
AM5KA506	DEVICE CABLE MSRMT 2 FT TANGENT	1	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	Y
AM5KA509	DEVICE CABLE MSRMT 2 FT TANGENT	1	512/80PPR	AM5KP163	0.15V TENSION	AM5KA069C	N
AM5KA510	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KA074	0.15V TENSION	AM5KA069C	Y
AM5KA510A	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KA068B	0.15V TENSION	AM5KA069C	Y
AM5KA510B	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KA074	0.15V TENSION	AM5KA069C	N
AM5KA514	DEVICE BRAID LINE MSRMT 2 FT TANGENT	1	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	N
AM5KA516	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	N
AM5KA516-550	DEVICE CABLE MSRMT 550 WHEELS	2	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	N
AM5KA516-650	DEVICE CABLE MSRMT 650 WHEELS	2	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	N
AM5KA516	DEVICE CABLE MSRMT 2 FT TANGENT	1	1200PPR	AM5KP161	0.15V TENSION	AM5KA069C	N
AM5KA517	DEVICE CABLE MSRMT 2 FT TANGENT	2	512/80PPR	AM5KA070B	0.15V TENSION	AM5KA069C	Y
AM5KA517A	DEVICE CABLE MSRMT 2 FT TANGENT	2	512/80PPR	AM5KA070B	0.15V TENSION	AM5KA069C	Y
AM5KA518	DEVICE CABLE MSRMT 2 FT TANGENT	2	512/80PPR	AM5KP163	0.15V TENSION	AM5KA069C	Y
AM5KA523	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KP163	0.15V TENSION	AM5KA069C	N
AM5KA532	DEVICE CABLE MSRMT 0.15V TEN	1	300PPR	AM5KP189	0.15V TENSION	AM5KA069C	N
AM5KA536	DEVICE CABLE MSRMT 2 FT TANGENT	2	300PPR	AM5KP189	0.15V TENSION	AM5KA069C	Y
AM5KA537	DEVICE CABLE MSRMT 2 FT TANGENT	1	300PPR	AM5KP189	0.15V TENSION	AM5KA069C	N
AM5KA519	DEVICE CABLE MSRMT 2 FT TANGENT	0	NO ENCODER	0	2mV/V TENSION	AM5KA071	N
AM5KA522A	DEVICE CABLE MSRMT ZONE 1	1	1200PPR	AM5KP164	2mV/V TENSION	AM5KA078	N
AM5KA522A-1	DEVICE CABLE MSRMT ZONE 1	1	1200PPR	AM5KP164	2mV/V TENSION	AM5KA078	N
AM5KA522B-2	DEVICE CABLE MSRMT ZONE 1	1	1200PPR	AM5KP164	2mV/V PASSIVE	AM5KA078	Y
AM5KA527A	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KA080B	2mV/V TENSION	AM5KA087B	Y
AM5KA527A-1	DEVICE CABLE MSRMT 2 FT TANGENT	2	1200PPR	AM5KA080B	2mV/V TENSION	AM5KA087B	Y
AM5KA513	DEVICE CABLE MSRMT 2 FT TANGENT	1	1200PPR	AM5KP161	2mV/V TENSION	AM5KA313B	N
AM5KA520	DEVICE CABLE MSRMT 2 FT WHEEL	1	1200PPR	AM5KP161	4.20MA TENSION	AM5KA4420	N
AM5KA525	DEVICE CABLE MSRMT 2 FT WHEEL	2	1200PPR	AM5KP161	4.20MA TENSION	AM5KA4420	Y
AM5KA526	DEVICE CABLE MSRMT 2 FT WHEEL	1	600PPR	AM5KP161	4.20MA TENSION	AM5KA4420	N
AM5KA530	DEVICE CABLE MSRMT 2 FT TANGENT	2	120PPR	AM5KP161	4.20MA TENSION	AM5KA4420	M
AM5KA534	DEVICE CABLE MSRMT 2 FT WHEEL	2	300PPR	AM5KP189	4.20MA TENSION	AM5KA4420	N
AM5KA535	DEVICE CABLE MSRMT 2 FT WHEEL	2	1200PPR	AM5KP182	4.20MA TENSION	AM5KA4420	N
AM5KA535-1	DEVICE CABLE MSRMT 2 FT WHEEL	2	1200PPR	AM5KP192	4.20MA TENSION	AM5KA4420	N
AM5KA521A-1	DEVICE CABLE MSRMT 2 FT WHEEL	2	1200PPR	AM5KA073B	2mV/V TENSION	AM5KA573A	Y
AM5KA521A-2	DEVICE CABLE MSRMT 2 FT WHEEL	1	600PPR	AM5KP191	2mV/V TENSION	AM5KA573A	N
AM5KA522B-3	DEVICE CABLE MSRMT ZONE 1	0	NO ENCODER	0	2mV/V PASSIVE	AM5KA673A	N
AM5KA539	DEVICE CABLE MSRMT CH 22	2	1200PPR	AM5KA073B	2mV/V NON AMP	AM5KP103	N
AM5KA547	DEVICE CABLE MSRMT CH 1CH	2	1200PPR	AM5KP188	2mV/V NON AMP	AM5KP103	Y
AM5KA549	DEVICE CABLE MSRMT CH	2	1200PPR	AM5KP188	2mV/V NON AMP	AM5KP103	N

The AMTKAD10 is now replaced by AM5KA069C

## **CONTENTS**

- 1.0 GENERAL**
- 2.0 SYSTEM DESCRIPTION**
- 3.0 OPERATION**
- 4.0 MAINTENANCE AND REPAIR**
- 5.0 OPTIONS AND ACCESSORIES**
- 6.0 CERTIFICATION DOCUMENTS**
- 7.0 RECOMMENDED SPARE PARTS**
- 8.0 DRAWINGS AND PARTS LISTS**
  - 8.1 MEASURING HEAD ASSEMBLY**
  - 8.2 MAGNETIC MARK DETECTOR**
  - 8.3 LOAD PIN**
  - 8.4 ENCODER**
  - 8.5 BACKUP ODOMETER**

## Manual Revision Log

### Revision R - Jun 2010

Page 12	Added contact information for customer support
Pages 24-27	Added Options and Accessories section
Pages 43-48	Added new ATEX Zone 2 Certificates
	Updated parts lists and numbers

## 1.0 GENERAL

The AM5K Wireline Measuring Device is a compact and lightweight device for measuring both wireline depth and tension. The device is designed to be mounted to the spooling arm of a wireline unit. It is unique to other measuring devices in that it measures both depth and tension on wireline cables from .190" to .494". This device will work on both open and cased hole wireline units which allows standardization on a measuring head for all types of operations.

### FEATURES AND BENEFITS:

- **Straight-line measurement** - (cable sizes can be changed without affecting depth measurement)
- **Dual Tangential Measuring Wheels** - made from specially hardened steel
- **Accepts cable sizes** - from .190" to .494" diameter (4.8 mm to 12.55 mm)
- **Optional guide wheels** - available for wirelines up to .650" diameter
- **Lightweight design with integral tension** - makes for easier high angle rigup
- **Device opens up** - to provide easy cable installation and removal, by removing a single pin
- **Includes both horizontal and vertical guide rollers** - to minimize measuring wheel loading
- **Rollers are oversized** - to increase reliability and reduce maintenance
- **Guide rollers are made from composite material** - to reduce weight and cable wear
- **Rear or Center spooling arm mount** - to minimize head "jerking"
- **Tension Load Axle and amplifier** - can be configured for different outputs.
- **Digital Magnetic Mark Detector**
- **Accepts single or dual encoders**
- **Supports fully independent backup depth measuring system** - using a magnetic pickup
- **Backup depth system** - reduces drag on measuring wheel by eliminating mechanical drive cable
- **Encoder, Mark Detector, and Tension amplifier** - certified for Zone II area use
- **Anodized aluminum frame** - All steel parts are plated or SST
- **All bearings are SST**

## 2.0 SYSTEM DESCRIPTION

### DEPTH MEASUREMENT:

The AM5K Measuring Head uses dual spring-loaded measuring wheels to measure the amount of wireline moving to and from the borehole. The measuring wheels are coupled to one or two optical encoders that transmit electrical signals via a cable to the hoistman's panel and/or logging computer. An independently powered magnetic encoder is used for back up depth indication.

The hardened measuring wheels are 2.0000 ft. (.609600 m) in circumference. Springs are used to hold the measuring wheels in contact with the wireline. The springs are sized to provide the appropriate friction between the wheels and wireline. The frame members are anodized 6061-T6 aluminum.

Under ideal conditions, without magnetic marks, the measuring heads have an accuracy of +/- 3 m in 3000 m (10 ft in 10,000 ft.). With magnetic marks and accurate line stretch calculations, an accuracy of .3 m in 3000 m (1 ft in 10,000 ft) can be achieved. The Hoistman's panel is required to fully utilize the mark detection and stretch correction algorithms.

## **TENSION MEASUREMENT:**

The AM5K uses an electronic load axle to measure line tension. Three wheels are used to create a force on the load axle. To generate this force the wheel mounted on the load axle is offset from the other two slightly. This offset creates a slight bend in the cable.

As wireline tension increases the small offset creates a corresponding bending force on the strain-gauged load axle. An electronic signal is transmitted via cable to the hoistman's panel and/or logging computer representing wireline tension. A calibrate resistor is included in the load pin to send out a signal to calibrate the computer system.

## **GENERAL SPECIFICATIONS:**

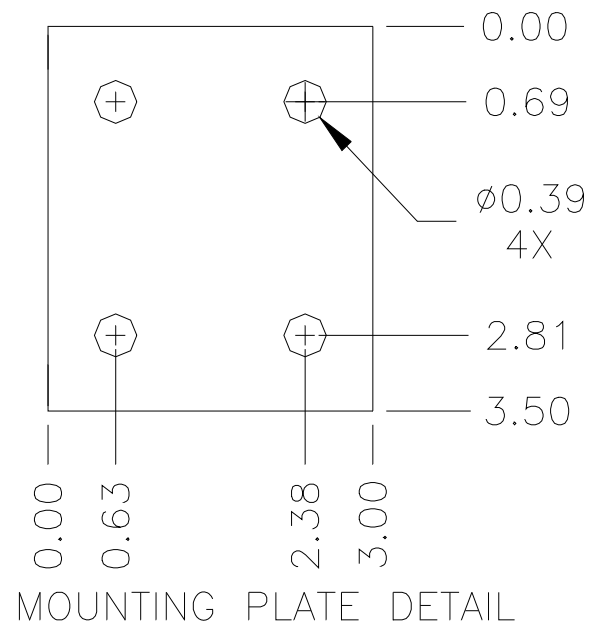
WEIGHT:	58 lbs	26.3 kg
LENGTH:	26.5"	673 mm
HEIGHT:	10.8"	274 mm
WIDTH:	15.3"	389 mm
MAXIMUM TENSION:	20,000 lbs	9072 kg
MEASURING WHEEL SIZE:	24.000"	609.60 mm
CABLE SIZES:	.190" to .494"	4.8 mm to 12.55mm
CABLE BEND OVER TENSION WHEEL:	2.5 – 7.5 degrees (depends on cable) Minimal or no affects on magnetic marks	

## 3.0 OPERATION

### 3.1 SPOOLING ARM INSTALLATION – OVERHEAD SPOOLING ARM

***Take Adequate Precautions when installing the Measuring Head to Avoid the Risk of Mechanical Damage***

Install the measuring head on to the spooling arm by using the top adapter mount assembly to mount to an overhead spooling arm. The mount is designed to mount with a standard U-joint yoke.

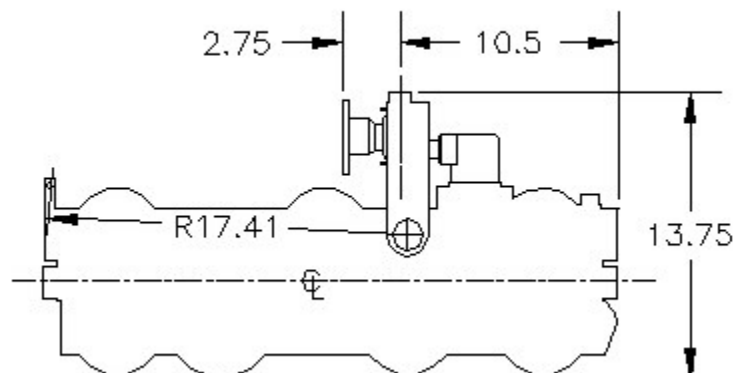
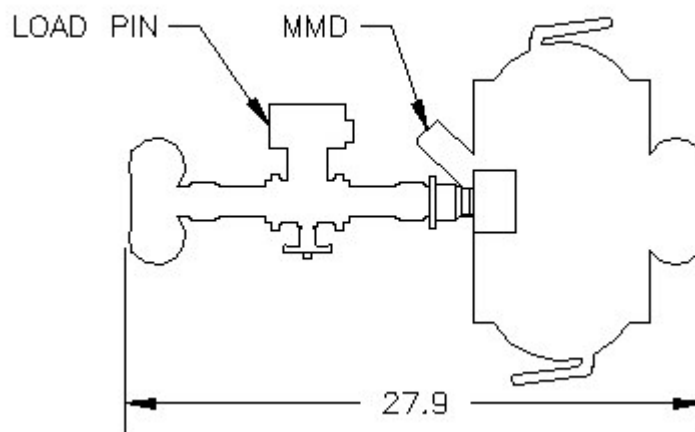
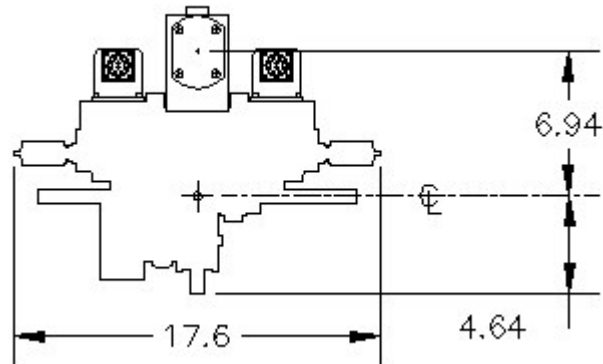


### 3.1 SPOOLING ARM INSTALLATION continued



**MOUNTING YOKE**

Make sure that the head can freely sit on the wireline. If the mounting arrangement will not let the head travel up and down freely and if the cable puts a upward or downward force on the measuring head, this force will cause an offset to the tension measurement which will result in an incorrect tension reading.



### 3.2 CABLE INSTALLATION

To install cable, first open the wheels by shifting the red release handles.

Next, remove the push pin, and hinge the head open.

Lifting up on the wireline cable makes it easier to remove the push pin.



The cable can now be inserted or removed.

Close the red release handles to tighten the wheels against the wireline.

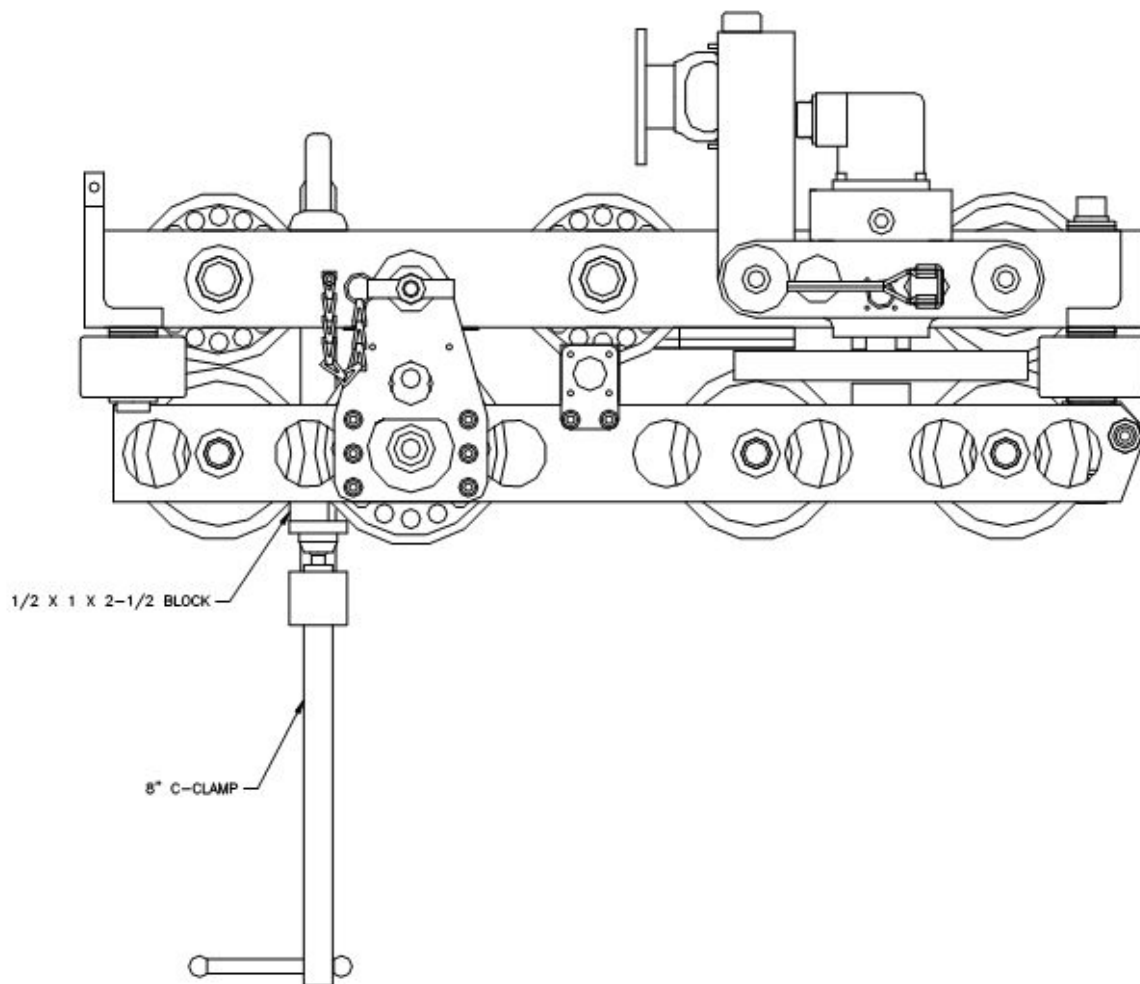
Swing the head closed and reinsert the pin.

### 3.3 CABLE REMOVAL UNDER LOAD

**3.3.1** If under load, the load will need to be removed from the device prior to removing the retaining pin. A "C-clamp" or a nylon "ratchet strap" can be used to remove the load.

**3.3.2** Install a C-Clamp across the top and bottom frames as shown in the drawing below. The ratchet strap can be installed in a similar way.

**3.3.3** Tighten the C Clamp until the load is removed from the retaining pin. Remove the retaining pin then loosen and remove the C Clamp.



### **3.4 CHANGING CONFIGURATION BETWEEN OPEN HOLE AND CASED HOLE**

A measuring head configured for open hole will typically contain a magnetic mark detector and a 2<sup>nd</sup> encoder. Cased hole operations rarely require a magnetic mark detector and typically use only one encoder.

If the head is configured for open hole, no changes are required to run it on a cased hole unit. You may elect to remove the magnetic mark detector if you have no plans to use the head on an open hole unit any time in the near future.

The cased hole head can be configured with a different wear plate. The cased hole wear plate is thicker and stepped on one end to keep the line from riding near the top of the wheels. This can occur when going in the hole with a small cable (7/32") with a very light load. The open hole wear plate is flat. Both plates are made from hardened tool steel. The wear plate is mounted on the upper frame above the measure wheels.

Part number for the open hole wear plate is: AM5KM034

Part number for the cased hole wear plate is: AM5KM074

**3.4.1** To remove the magnetic mark detector, refer to item 12 on the parts list. Remove the four screws holding the detector in place then remove the detector. To install a magnetic mark detector, reverse this procedure.

**3.4.2** To remove an encoder, remove the four screws securing the encoder adapter to the head. Remove the encoder and adapter. Remove the coupling from the measuring wheel shaft.

### **3.5 INSTALLING THE DEEP GROOVED TENSION WHEEL**

**3.5.1** A deep grooved "High Tension" wheel is available for use when line tension greater than 12,000 lbs is commonly encountered. This wheel is grooved to better support the wireline at high tensions. The groove also reduces the radius of the wheel which lowers the bend angle of the wireline. This wheel is only for use with 15/32" or larger cables and cannot be used with smaller cable sizes.

The normal shallow grooved wheel can be used at high loads for short pull durations but should not be used when loads exceed 12,000 lbs for an extended period of time.



**DEEP GROOVED HIGH TENSION WHEEL**



**STANDARD SHALLOW GROOVED TENSION WHEEL**

**3.5.2** To install the deep grooved tension wheel, replace the standard shallow grooved tension wheel with the deep grooved tension wheel. The load pin does not need to be changed. To account for the decreased bend angle of the cable, the Load Cell Angle value will need to be changed when using this wheel.

Ensure that the slot in the bushing of the tension wheel is aligned with the roll pin on the side of the frame. The roll pin is only installed on one side of the frame and it needs to be inserted in the slot.

Also ensure that the grease hole in the tension wheel is installed on the opposite side as the load pin amplifier.

### 3.6 SYSTEM OPERATION

**3.6.1** Determine cable size to be used – .490" to .190". Since the wireline cable actually bends over the tension wheel, the bend radius of the wireline cable will affect the tension measurement.

**3.6.2** Enter tension calibrate factor. These corrections are automatically made in the Benchmark Hoistman's panel by selecting the proper cable size from the menu. If a different panel is used, enter the tension factor at this time.

Value for **shallow grooved** tension wheel with standard load pin

<u>VALUES</u>	<u>CABLE SIZE</u>
.9	.484
1	.472
1.1	7/16"
1.2	3/8"
1.4	5/16"
1.5	9/32"
1.8	7/32"

Value for **deep grooved** tension wheel with standard load pin

<u>VALUES</u>	<u>CABLE SIZE</u>
2.15	.490
2.30	.484
2.40	.472

**3.6.3** Install line in measuring head (refer to section 3.2).

**3.6.4** Make sure line is lying slack and head is free to move. Press the Ten Zero Cal button and tension value should read 0.

**3.6.5** Press the Ten Cal button and tension should read the value indicated in paragraph 3.6.2.

**3.6.6** At this point, the system is ready to log. Watch for visual indications of problems such as excessive vibration, wheel or roller slippage or lockups that signify bearing or shaft failures, or cable tracking problems.

## 4.0 MAINTENANCE AND REPAIR

### 4.1 OBTAINING TECHNICAL ASSISTANCE

Call BenchMark Wireline Products Inc. at +1 281 346 4300  
Or contact by email [mail@benchmarkwireline.com](mailto:mail@benchmarkwireline.com)  
Or fax in request at +1 281 346 4301

Information in the form of user manuals and instructional videos are also available on our website [www.benchmarkwireline.com](http://www.benchmarkwireline.com)

Parts can be ordered by email, phone, or fax

Equipment can be returned for repair and maintenance. Please notify us by Phone, email, or fax before sending any equipment.

To return equipment to BenchMark, ship it to:  
BenchMark Wireline Products  
36220 FM 1093  
Simonton, Texas 77476  
U.S.A.

## **4.2 PRE-JOB CHECK**

Each time the system is used perform the following steps:

Verify that the AM5K is properly and securely attached to the spooling arm. Several different mounting kits are available for different types of spooling arms.

Verify that the depth measuring wheels are clean and that no groove has been worn into the measuring wheel surface. Check the measuring and guide wheels for looseness, play, out-of-roundness, worn or rough sounding bearings, or other mechanical conditions that could affect measurement accuracy. Ensure that the wheel bearings inner race is not spinning on the shaft and that the shaft is not spinning in the bushings.

Verify that all fasteners are tight and that the ball lock pushpin is secure. Verify that the encoder, electronic load pin, and backup counter cable are installed and properly routed. Verify that the depth system is working by turning the wheel and observing the hoistman's panel and backup display unit to indicate cable movement. The hoistman's panel and backup display should measure 2' for each rotation of the wheel. If more than one encoder is installed check both encoders by turning each wheel and verifying that the hoistman's panel will read 2' for each rotation of either wheel.

### **4.3 POST-JOB MAINTENANCE**

At the completion of each job, thoroughly clean and dry the device as soon as possible. This avoids problems caused from borehole residues transferred from the wireline onto the measuring device. Borehole residues should be washed from the device with a cleaning solvent such as Varsol or an equivalent type. Rinse the device with water, dry, and wipe down with an oily rag.

**Do not pressure wash**

#### 4.4 MONTHLY MAINTENANCE

Visually inspect the interiors of the electrical connectors for the encoders and electronic load axle for dirt and evidence of insulation breakdown. Clean or replace as necessary. Install dust caps on the connectors if the cables are removed.

Manually rotate each wheel by hand to verify its condition. Inspect the depth measuring wheels for signs of abnormal wear, diameter changes, or shaft/bearing play that can affect measurement accuracy. The wheel should be replaced if it is grooved more than .005". The wheel should be 7.639 / 7.640" (194 mm) in diameter with a 24" circumference (609.6 mm).

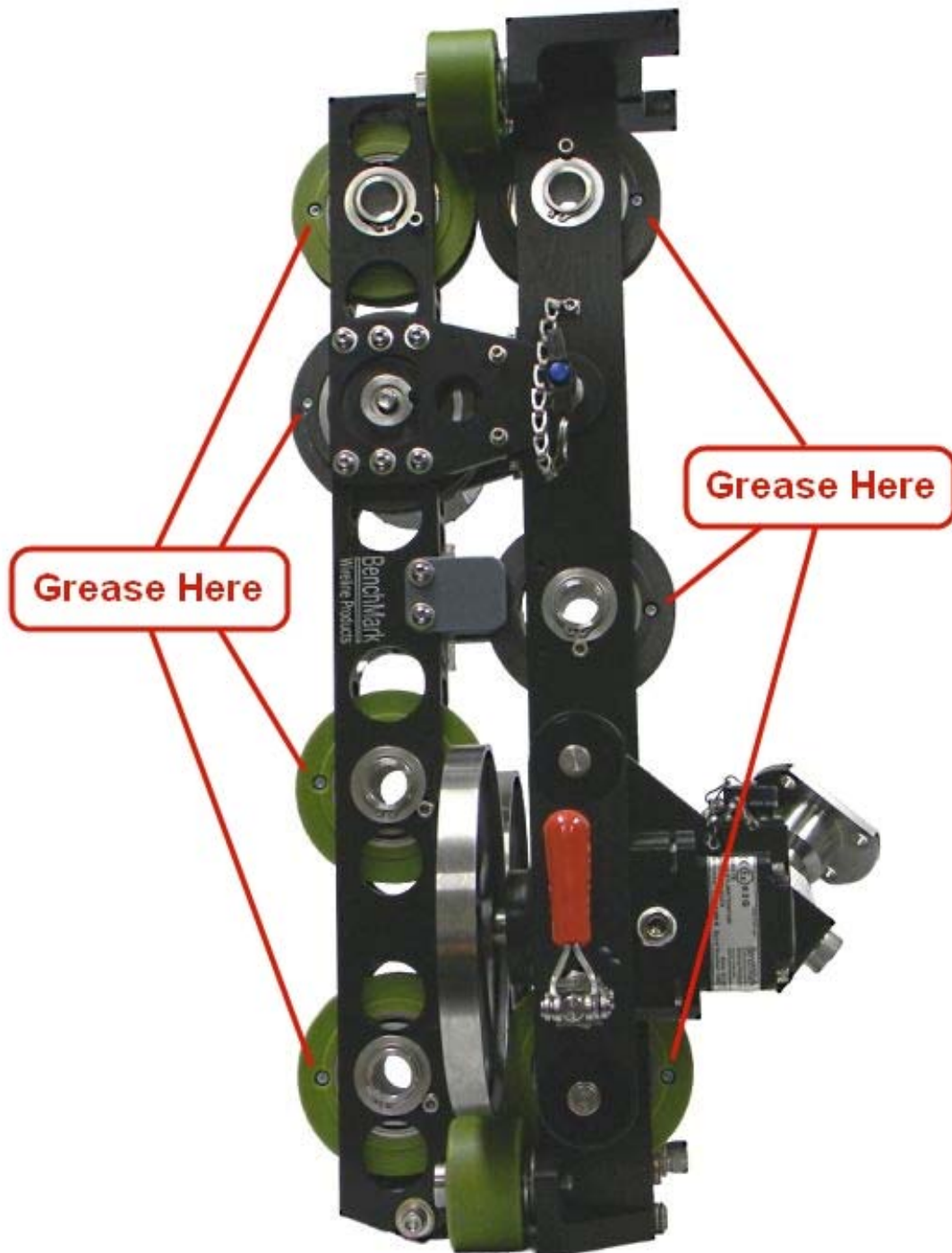
Inspect the tension wheel for signs of abnormal wear, diameter changes, or shaft and bearing play that could affect tension measurement accuracy. The shallow groove tension wheel (item 33 in section 6.1 of this manual) should be 5" in diameter at the bottom of the groove. It should be replaced if it is worn more than .010".

The deep grooved tension wheel (item 33 in section 6.1 of this manual) should be 4.375" in diameter at the bottom of groove. It should be replaced if it is worn more than .010".

Inspect the two grooved guide wheels on either side of the tension wheel (items 34 in section 6.1 of this manual). They should be 4" (101.6 mm) in diameter (bottom of groove). They should be replaced if they are worn more than .010".

**NOTE: If the tension wheels or guide wheels mentioned above are worn more than .010" then the tension reading will be less than the actual line tension. The amount of error is relative to the amount of wear.**

Grease all the wheels and bearings that are fitted with a flush mount grease fitting (see following diagram). Use a water-proof, marine grade grease. An inverted grease nozzle (p/n AM5KP130) is supplied with each head. This nozzle will fit any standard grease gun.



## **4.5 ASSEMBLY / DISASSEMBLY PROCEDURES**

### ***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

#### **4.5.1 MEASURING WHEEL, SHAFT, AND BEARING REMOVAL**

Either measuring wheel can be removed from the measuring head. First shift the red release handle to move the wheel away from the frame. Next remove the encoder with its adapter.

On the later model heads, the wheels are keyed onto the shaft and can be removed simply by removing the screw holding the wheel to the shaft.

On earlier model heads, the wheels are pressed on to the shaft. The lower snap ring between the wheel and the bearing must first be removed. Pull the wheel and shaft from the mount. Reassemble in the opposite order. The bearing should also be replaced at this time.

#### **4.5.2 ELECTRONIC LOAD PIN REMOVAL**

The electronic load pin is held in place by one retaining ring on the outer end of its shaft. Remove the retaining ring by using a small screw driver to lift one end of the ring out of the groove then “walk” the ring off of the pin. The load pin can then be removed from the mounting frame.

#### **4.5.3 BACKUP DEPTH MAGNETIC PICKUP REMOVAL AND INSTALLATION**

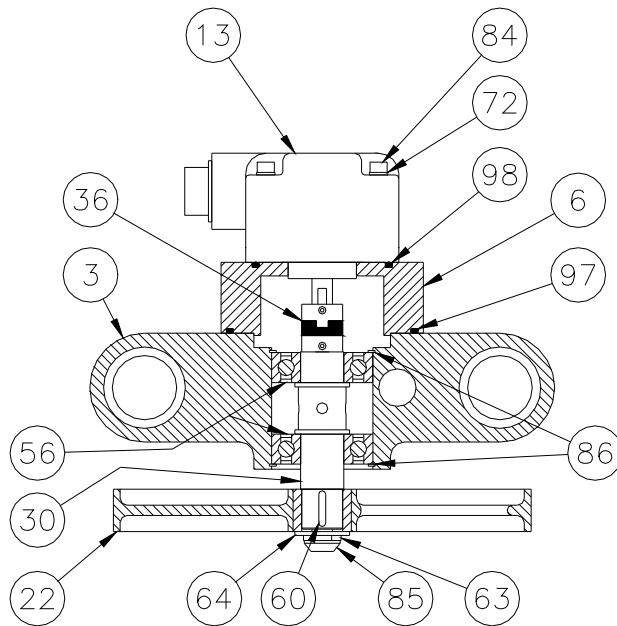
The backup depth magnetic pickup is mounted to the encoder adapter. It is held in place by four screws. Remove the screws and the pickup can then be removed. The pickup must be properly oriented to work correctly. The slot should be oriented to the top. The top side is the encoder side. Ensure that an o-ring is inserted between the plastic housing and the mount. An additional o-ring is used between the connector and the housing to keep moisture out.

If the backup display is counting backward (i.e. counting negative when going down hole), simply rotate the pickup 180 degrees to change the direction.

#### 4.5.4 ENCODER COUPLING INSTALLATION

To install the encoder coupling, first remove the plug in the encoder adapter. Install one of the metal parts of the three piece coupling (item 36) to the wheel shaft and tighten it using a hex wrench. Next, install the center plastic piece of the coupling onto the wheel shaft coupling. Place the other metal coupling on the encoder shaft and set the encoder on the mount. Snug up the encoder coupling then remove the encoder and tighten the coupling.

Reinstall the encoder with o-rings (item 98) and tighten it to the encoder mount (item 6). Next tighten the plug.

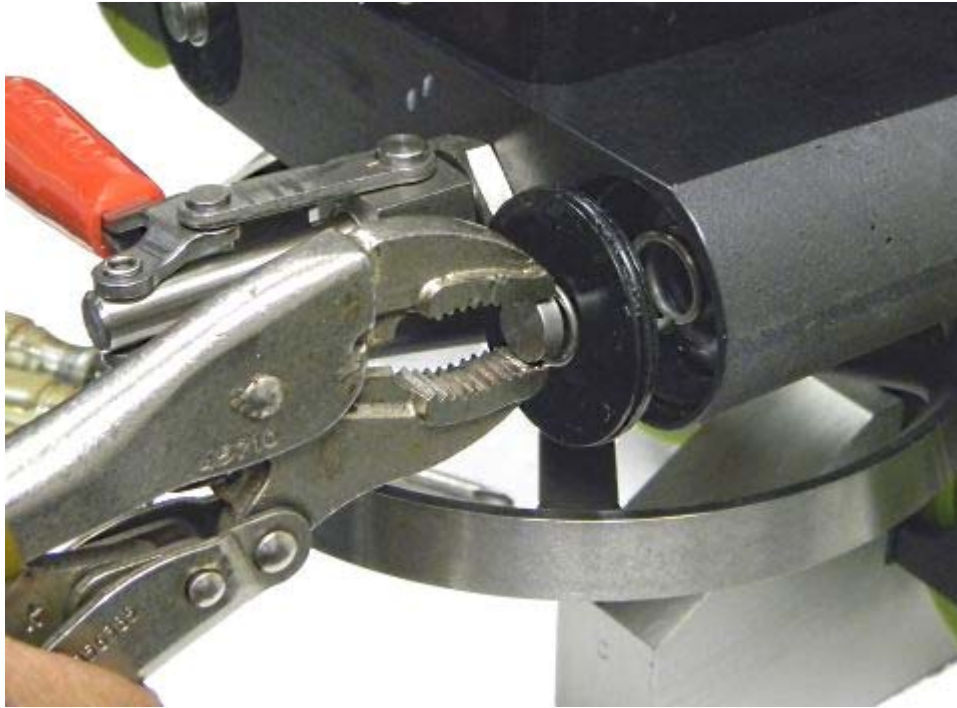


See Parts List in Section 8.1

#### 4.5.5 ENCODER MOUNT AND TOP GUIDE WHEEL REMOVAL

Follow these steps to remove the encoder mounts.

1. Using a pair of vice grips, grab the end of the pin and pull on it.



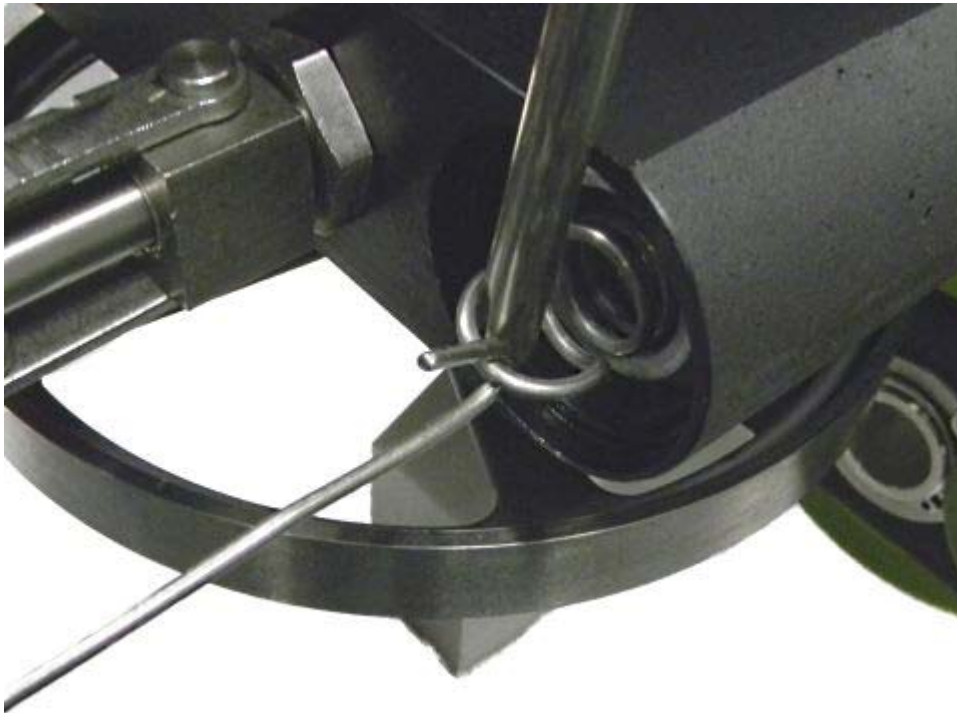
2. Use a screw driver to capture the end of the spring.



3. The end cap and the pin can now be removed.



- 4 Use a hook to pull the spring out far enough to remove the screwdriver (Careful not to bend the spring).



5. Remove the floating encoder assembly.



6. Repeat for the other side.

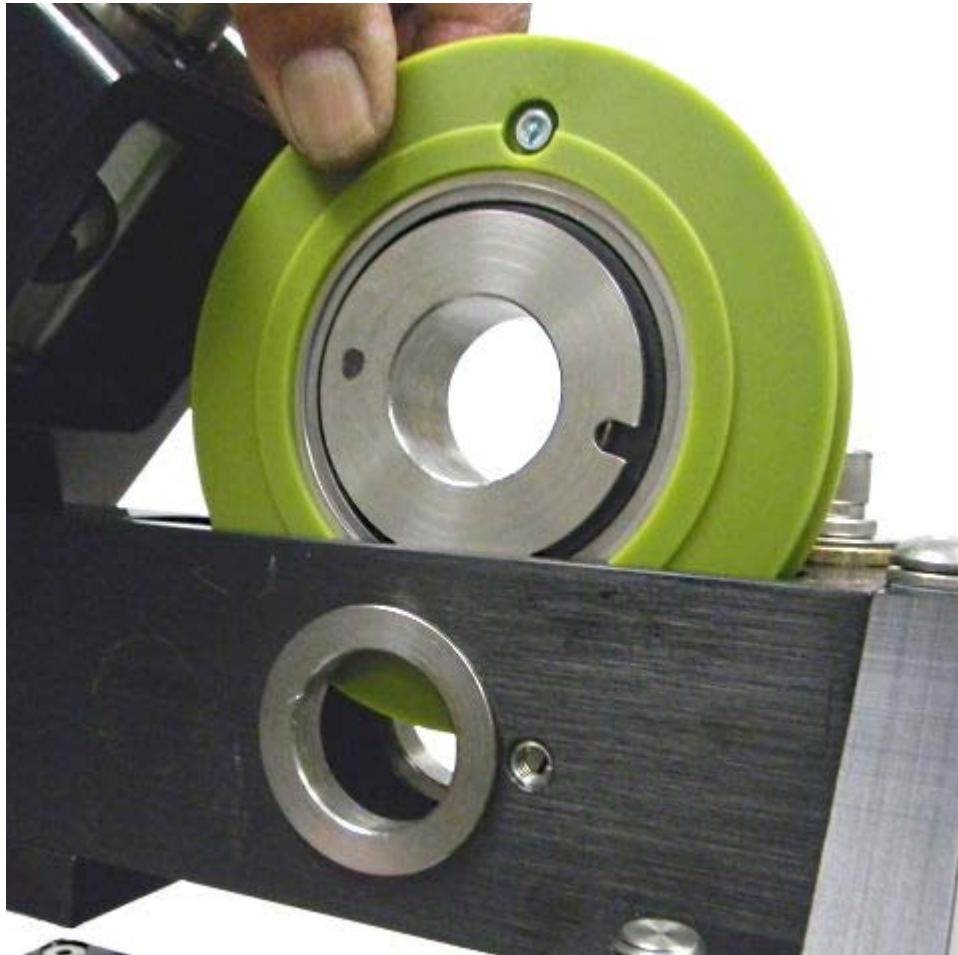
7. Remove anti-rotation screw (if equipped).



8. Remove snap ring and pull out sliding shaft.



9. Remove the wheel assembly.



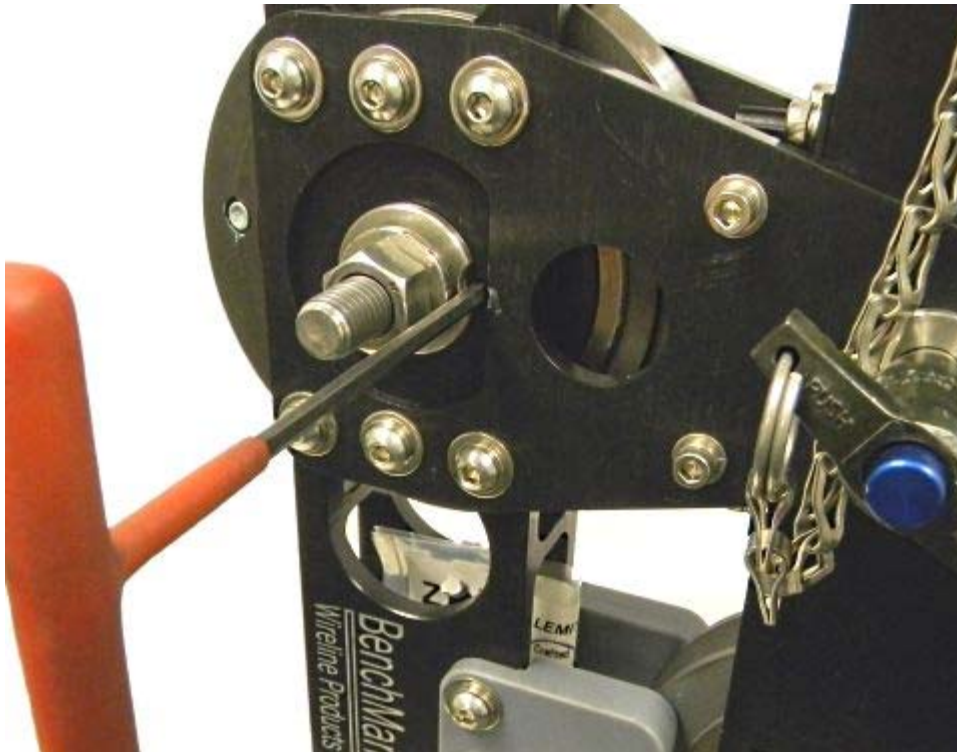
10. Re-assemble in reverse order making sure that slot in the bearing lines up with the anti rotation screw hole (if equipped).

#### 4.5.6 INSTALLING THE LOAD AXLE WHEEL

1. Insert the tension wheel into the frame. Make sure the slotted hole in the tension wheel bushing is on the same side as the roll pin hole in the frame and the grease hole is on the opposite side.



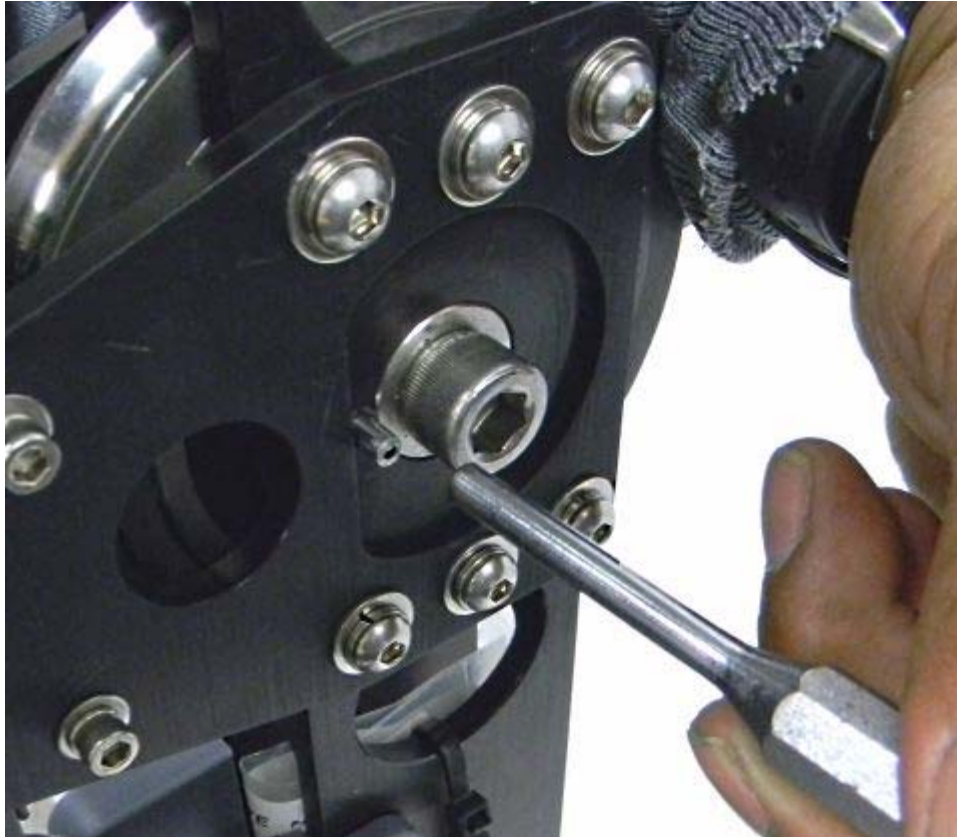
2. Use a bolt in place of the load pin to hold it in place. Install an Allen wrench or other long tool to align the hole in the bearing with the slotted hole in the frame.



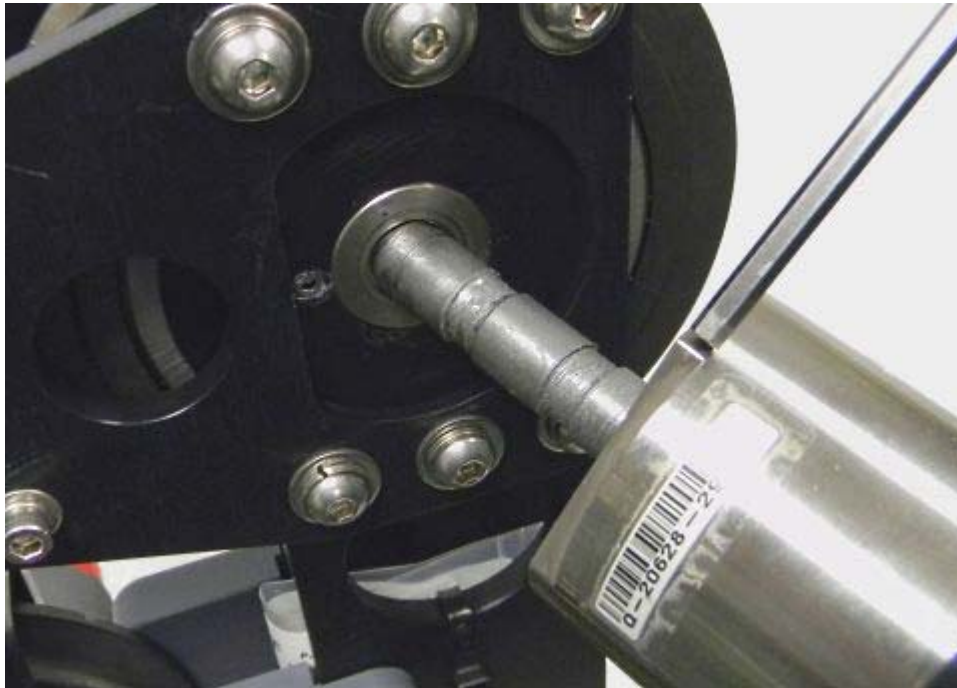
3. Insert a 3/16" x 1/2" long roll pin into the hole. Do not use a longer roll pin as it will bind the wheel.



4. Drive the roll pin flush. Make sure that the wheel can freely slide up and down in the frame.



5. Remove the bolt and install the load pin. Align the notch in the load pin with the flat side on the frame.



**AFTER ASSEMBLY IS COMPLETE THE LOAD PIN SHOULD BE  
CONFIGURED AS SHOWN BELOW**



## 5.0 OPTIONS AND ACCESSORIES

### 5.1 SHIPPING CASE AM5KM197

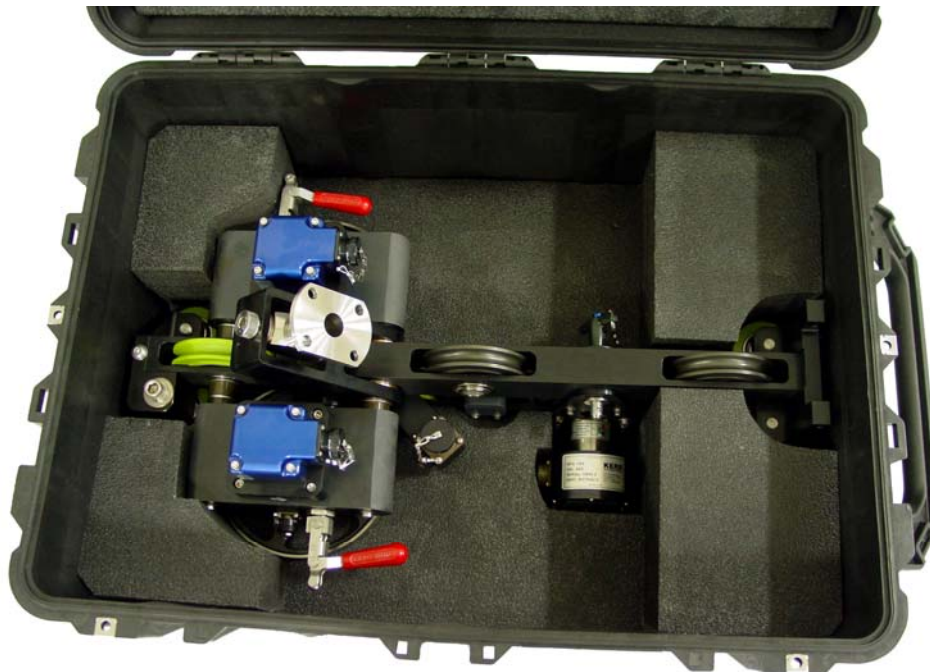
This case is designed to help easily transport the measuring head.

CUSTOM FOAM LINED FOR AM5K

RETRACTABLE HANDLE

ROLLER WHEELS

OUTSIDE DIMENSIONS: 31.5L X 22.88W X 18.88



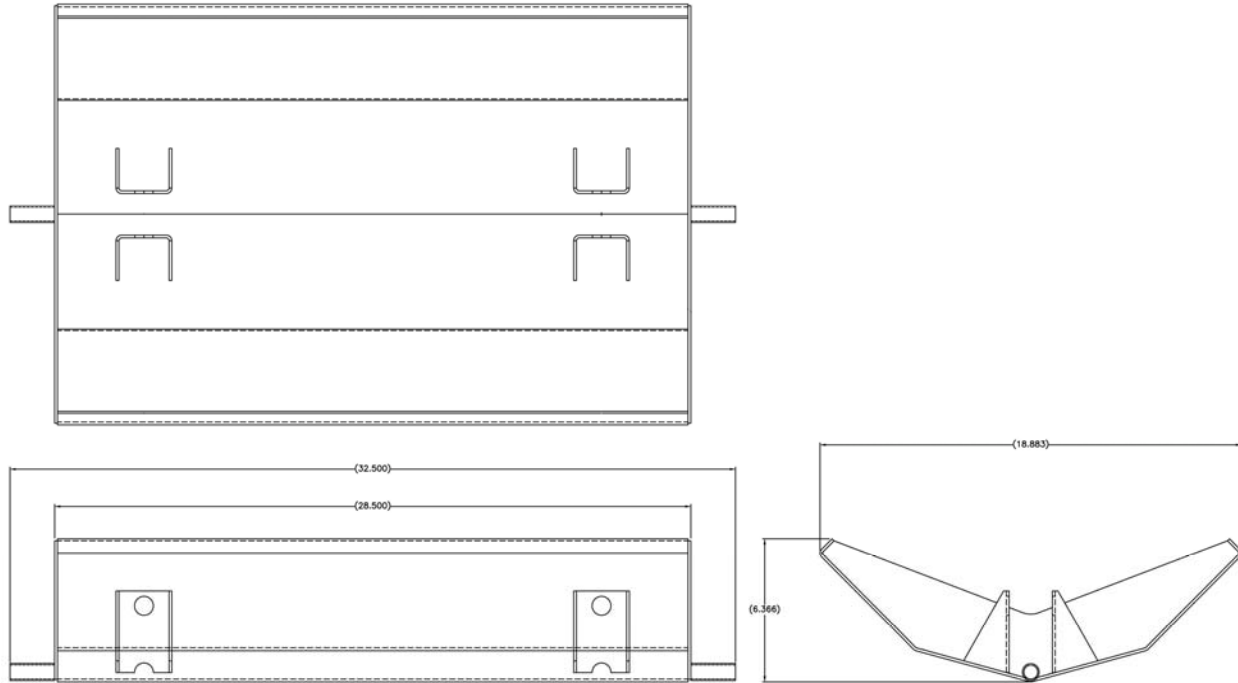
## 5.1 SHIPPING CASE continued - AM5KM197



AM5K SHIPPING CASE

## 5.2 AM5KA090 DRIP PAN KIT

This drip pan will mount to the bottom of the AM5K measuring head. It is designed to capture fluids and debris that drip or fall from the measuring head. A hose is provided as a means to drain the pan into an external container.



P/N	DESCRIPTION	QTY	UNIT
AM5KM090	PAN DRIP ALUMINUM AM5K	1	EA
AM5KM092	PIN CLEVIS 13/16 X 2-3/4 SST	2	EA
AM5KP205	PIN HAIR 0.125 X 5/8-7/8 SST	4	EA
AM5KP209	TEE 3/4 MALE PUSH-ON NYLON	1	EA
AM5KP208	CLAMP HOSE 0.56-1.06 SST	5	EA
AM5KP207	TBG PVC .75ID X 1.00OD CLEAR	12	EA

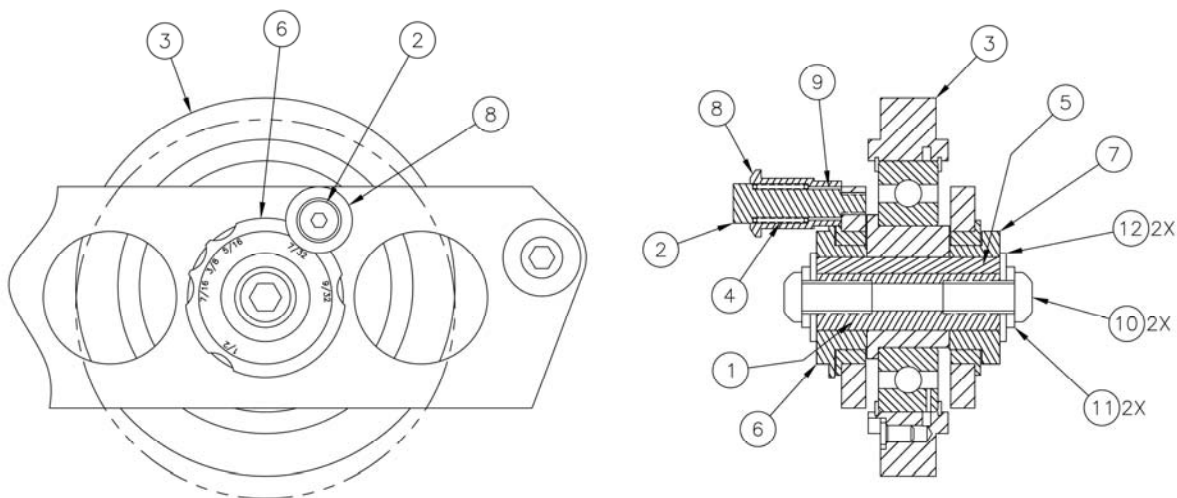
### 5.3 AM5KA239 ADJUSTABLE GUIDE ROLLER KIT

This kit is designed to force smaller sizes of wireline to run straight across the measuring wheels. Large wirelines (7/16" or larger) are stiff enough so they will run straight but smaller lines such as 7/32" can walk up/down the measuring wheel if they are not under much tension. This can occur when running into the well with pressure through grease tubes. This will cause a depth error (less depth measured then actual) because any vertical movement of the wireline will not turn the measuring wheel as far as it should.

This roller is mounted on an adjustable cam shaft. The shaft can be turned to raise or lower the roller to press the wireline against the bottom of the groove in the upper guide roller. This assures that the wireline will run straight across the measuring wheels.



### 5.3 AM5KA239 ADJUSTABLE GUIDE ROLLER KIT continued



### AM5KA239 ADJUSTABLE GUIDE WHEEL PARTS LIST

ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AM5KM231	SHAFT KEYED 3/4 ADJ RLR SST	1	EA
2	AM5KM232	BOLT MOD SHOULDER 5/16 X 1 SST	1	EA
3	AM5KA144	ASSY WHEEL GUIDE 4.266 SST	1	EA
4	AM5KP234	SPRING COMP 7/8 OAL 0.42 OD	1	EA
5	AM5KP235	KEY 3/16 SQUARE SST	2	EA
6	AM5KM146	BUSHING INDEXED KEYED 30MM	1	EA
7	AM5KM147	BUSHING 30MM KEYED 3/4 SHAFT	1	EA
8	AM5KM148	COLLAR LATCH ADJ ROLLER SST	1	EA
9	AM5KP236	BEARING BRZ .314 ID X .378 OD	1	EA
10	AM5KP181	SCREW 3/8-16 X 3/4 BUTTON HD	2	EA
11	AMS1P058	WASHER 3/8 LOCK SS	2	EA
12	C276P513	WASHER 3/8 FLAT SST	2	EA

#### 5.4 550 WHEELS AM5KK550

This kit includes guide wheels and tension wheel that are grooved to fit wirelines from .500" up to .550" diameter.

The kit includes 6 steel guide wheels. It replaces the two steel guide wheels and four plastic guide wheels on the standard head. A new tension wheel is also included.

The tension "K" factor is different with this wheel.

P/N	DESCRIPTION	QTY	UNIT
AM5KA091	ASSY WHEEL TENSN FIXD 35MM BRG	6	EA
AM5KA095	ASSY WHEEL TENS 0.550 LOAD AXL	1	EA

## 5.5 650 WHEELS AM5KK650

This kit includes guide wheels and tension wheel that are grooved to fit wirelines from .550" up to .650" diameter.


The kit includes 6 steel guide wheels. It replaces the two steel guide wheels and four plastic guide wheels on the standard head. A new tension wheel is also included.

The tension "K" factor is different with this wheel.

P/N	DESCRIPTION	QTY	UNIT
AM5KA092	ASSY WHEEL TENSN FIXD 35MM BRG	6	EA
AM5KA096	ASSY WHEEL TENS 0.650 LOAD AXL	1	EA

## 6.0 CERTIFICATION DOCUMENTATION

### 6.1 MEASURING HEAD ATEX Conformity Certificate



### ATEX Conformity Variation Certificate

**Epsilon Certificate Number:**  
Epsilon 02ATEX1144/1

**This certificate is issued for the following equipment:**  
5 Wheel Cable Measurement Device.  
Inline Tension Device.

**Manufactured and submitted by:**  
Kerr Measurement Systems, Inc.  
6415 Reading Road  
Rosenberg  
Texas 77471  
USA


**The equipment shall be designed and constructed in accordance with the specification set out in the schedule herein and documents referred to therein.**

**This Certificate is issued subject to the conditions of Epsilon Compliance and any additional conditions as may be prescribed.**

**This Certificate does not imply that the equipment meets all statutory requirements in any particular industry or circumstance.**

**Directive/s:**  
ATEX Directive, 94/9/EC

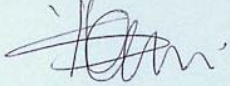
**Standard/s:**  
EN50021: 1999


**Coding:**  
CE  EEx nA II T6

**Project Number:**  
ETS0412


**Issue Date:**  
01 November 2004

**Report Number:**  
ETS(A)0412/B/1  
On Behalf of Epsilon Compliance

  
S L D'Henin  
Certification Manager




**This certificate may only be used in its entirety and without change**



Epsilon Compliance (UK),  
Drury Lane, Drury, Buckley, CH7 3DU, UK.  
Telephone: +44(0)1244 541551  
Fax: +44(0)1244 543888

1/2

## 6.2 MEASURING HEAD ATEX Conformity Certificate – Sheet 1



### ATEX Variation Conformity Certificate Schedule

**Epsilon Certificate Number:**  
Epsilon 04ATEX1144/1

**Variation 1 Description:**  
The 5 wheel measuring device range is extended to include the following versions:

- 512/780PPR 0-1.5V
- 2X1200PPR MS16 0-1.5V DIFF
- 2X1200PPR MS16 2.0mV/V

An inline tension device of the following types is included in the scope of the certificate:


- 0-1.5V DIFF
- 2.0mV/V

**Drawings:**


Number	Rev	Date	Title
AMTKA105	A	4/03	DEVICE ASSY INLINE TENSION 0-1.5V DIFF EEx nA
AMTKA106	A	4/03	DEVICE ASSY INLINE TENSION 2.0 mV/V EEx nA
AM5KA107	B	4/03	DEVICE ASSY 5 WHEEL 2 X 1200PPR MS16 2.0mV/V EEx nA
AM5KA110	B	4/03	DEVICE ASSY 5 WHEEL 2 X 1200PPR MS16 0-1.5V DIFF EEx nA
AM5KA117	A	4/03	DEVICE ASSY 5 WHEEL 512/780PPR 0-1.5V EEx nA
AM5KA121	A	4/03	DEVICE ASSY 5 WHEEL BASE MODEL EEx nA
AM5KA507	A	8/04	DEVICE ASSY 5 WHEEL 2 X 1200PPR MS16 2.0mV/V EEx nA GEN II
AM5KA510	A	8/04	DEVICE ASSY 5 WHEEL 2 X 1200PPR MS16 0-1.5V DIFF EEx nA GEN II
AM5KA517	A	8/04	DEVICE ASSY 5 WHEEL 512/780PPR 0-1.5V EEx nA GEN II
AM5KA521	A	8/04	DEVICE ASSY 5 WHEEL BASE MODEL EEx nA GEN II

**Conditions of Certification:**  
None

**Special Conditions of Certification:**  
None



This certificate may only be used in its entirety and without change



Epsilon Compliance (UK),  
Drury Lane, Drury, Buckley, CH7 3DU, UK.  
Telephone: +44(0)1244 541551  
Fax: +44(0)1244 543888

2/2

## MEASURING HEAD ATEX Conformity Certificate – Sheet 2

### ATEX Certificate Schedule

Epsilon Certificate Number:

Epsilon Ex 02ATEX1144

Equipment Description:

The Type 2MV EX 5 Wheel Cable Measurement Device consist of the following certified parts:  
 Optical Encoder 1200 Pulse/Rev Ex, Magnetic Mark Detector EX and Load Axle 2MV/V EX.  
 The device is designed to measure various cable parameters using the listed sensors.

Drawings:

Number	Rev	Date	Title
AM5KA110 2 Shls.	A	May 02	DEVICE ASSY 5 Wheel Zone 2
AM5KM620	A	May 02	LABEL 5 Wheel 2MV EX
AM5KA527	A	April 06	DEVICE ASSY 5 WHL
AM5KA529	A	April 06	DEVICE ASSY 5 WHL
AM5KA521	A1	April 06	DEVICE ASSY 5 WHL

Conditions of Certification:

None

Special Conditions of Certification:

None

Note:

Certificate re issued in June 2006 to include additional drawings in the schedule list. These drawings have no affect on the original certification of the equipment.



Epsilon Certification Services Limited  
 Drury Lane, Buckley, Chester CH7 3DU, UK  
 Tel: +44 (0) 1244 541551 Fax: +44(0) 1244 543888  
 E-mail: certification@epsilon-td.com



Sheet 2 of 2

### 6.3 ENCODER ATEX Conformity Certificates

		
<p><b>1. TYPE EXAMINATION CERTIFICATE</b></p>		
<p><b>2. Equipment or Protective System Intended for use in Potentially Explosive Atmospheres</b></p>		
<p>3. Type Examination Certificate Number: <b>ETL09ATEX41116</b></p>		
<p>4. Equipment or Protective System: <b>2.0 mV/V Load Pin Assembly, model numbers AM5KA067, AM5KA072, AM5KA087, AM5KA313</b></p>		
<p>5. Manufacturer: <b>BenchMark Wireline Products</b></p>		
<p>6. Address: <b>36220 FM 1093 P.O. Box 850 Fulshear, Texas, TX 77441 USA</b></p>		
<p>7. This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.</p>		
<p>8. Intertek declares that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive 94/9/EC of 23 March 1994</p>		
<p>The examination and test results are recorded in confidential Report: 3183344DAL-001 dated December 03, 2009. The investigation was begun on 07/21/09 and concluded on 11/30/09. A type sample was made available and tested at the Intertek, Dallas, TX location.</p>		
<p>9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN 60079-0:2006, and EN 60079-15:2005 except in respect of those requirements referred to at item 16 of the Schedule.</p>		
<p>10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.</p>		
<p>11. This Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.</p>		
<p>12. The marking of the equipment or protective system shall include the following:-</p>		
 II 3 G Ex nA nL IIC T6		
<p>Intertek 1809 10<sup>th</sup> Street, Suite 400 Plano, TX 75074, USA Tel: (972) 202-8800 Fax: (972) 202-8801 <a href="http://www.Intertek.com">http://www.Intertek.com</a></p>		 <b>Ryan Parks</b> Hazardous Locations Team Leader Date: 2009/12/03
<p style="font-size: small;">This certificate may only be reproduced in its entirety and without any change, schedule included, and is subject to Intertek Testing Services NA, Inc. Testing and Evaluation Terms and Conditions.</p>		
<p>Sheet 1 of 3</p>		
<p style="font-size: x-small;">BenchMark ATEX Cert ETL09ATEX41116 <span style="float: right;">12/03/09</span></p>		

**Intertek**



**SCHEDULE**  
**TYPE EXAMINATION CERTIFICATE NUMBER: ETL09ATEX41116**

**13. Description of Equipment or Protective System**

The 2.0 mV/V Load Pin Assembly is a device to translate force or weight into an electrical signal (mV). The internal strain gauges change their electrical resistance in proportion to the strain placed on them. The resulting small signal is amplified and output as a voltage. This unit is constructed from high strength alloys and is powered from a suitable DC power supply -15V & +15V via an 8 or 10 pin military style circular connector.

Connector	Pin	Description
G	CAL	Calibration
F	SIG-	SIG OUT- Amplifier o/p
E	SIG+	SIG OUT+ amplifier o/p
C	-15V	-15V Power rail
D	GND	Power supply 0V.
B	+15V	+15V Power rail

Each 2.0 mV/V Load Pin Assembly has a 1/2-inch load pin, high strength alloy housing containing a 350 Ohm bridge, and a military style twist-lock connector.

**14. Report NUMBER**

Intertek Report 3183344DAL-001, dated 03 December 2009.

**15. Conditions for use:**

**a. Special Conditions for safe use**

There are no special conditions for safe use

**b. Conditions for use (Routine Tests)**

There are no routine tests

**16. Essential Health and Safety Requirements (EHSR's)**

The relevant EHSR's that have not been addressed by the standards listed in this certificate have been identified and assessed in Intertek Report 3183344DAL-001, dated 03 December 2009.

**17. DRAWINGS**

Intertek  
 1809 10<sup>th</sup> Street, Suite 400, Plano, TX 75074, USA  
 Tel: (972) 202-8800 Fax: (972) 202-8801  
<http://www.intertek.com>

Sheet 2 of 3

Benchmark ATEX Cert ETL09ATEX41116

12/03/09

**Intertek**



**SCHEDULE**  
**TYPE EXAMINATION CERTIFICATE NUMBER: ETL09ATEX41116**

Number	Issue	Date	Description
C276A032	B	08/01	Shaft. Load Pin (W/Sleeve)
AMS7M010	F	08/17/00	Load Pin E-1 Converter PCB Housing
AM5KM062	A	02/05	Lid Load Pin Housing
AMTKA013	B	12/18/01	Low Voltage Load Cell Amp Kerr Measurement Systems
AM5KM464	A	07/29/09	Label Load Pin 09ATEX41116 Ex nA
AM5KA067	D	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10 Pin EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA067D
AM5KA072	B	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10P HT EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA072D
AM5KA087	B	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10PIN EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA087D
AM5KA313	B	08/19/09	Assy Load Pin 2mV/V ½ Dia KP 16 8PIN EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA313D

On the basis of the referenced test report(s), the type sample(s) of the product has(have) been found to comply with the relevant harmonized standard(s) listed on this certificate at the time the tests were carried out.

This Certificate is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test/inspection results referenced in this Certificate are relevant only to the type sample tested/inspected. This Certificate by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program

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 Tel: (972) 202-8800 Fax: (972) 202-8801  
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Sheet 3 of 3

Benchmark ATEX Cert ETL09ATEX41116

12/03/09

## 6.4 LOAD PIN ATEX Conformity Certificates

	
<p><b>1. TYPE EXAMINATION CERTIFICATE</b></p>	
<p><b>2. Equipment or Protective System Intended for use in Potentially Explosive Atmospheres</b></p>	
<p>3. Type Examination Certificate Number: <b>ETL09ATEX41116</b></p>	
<p>4. Equipment or Protective System: <b>2.0 mV/V Load Pin Assembly, model numbers AM5KA067, AM5KA072, AM5KA087, AM5KA313</b></p>	
<p>5. Manufacturer: <b>BenchMark Wireline Products</b></p>	
<p>6. Address: <b>36220 FM 1093 P.O. Box 850 Fulshear, Texas, TX 77441 USA</b></p>	
<p>7. This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.</p>	
<p>8. Intertek declares that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive 94/9/EC of 23 March 1994</p> <p>The examination and test results are recorded in confidential Report: 3183344DAL-001 dated December 03, 2009. The investigation was begun on 07/21/09 and concluded on 11/30/09. A type sample was made available and tested at the Intertek, Dallas, TX location.</p>	
<p>9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with standards EN 60079-0:2006, and EN 60079-15:2005 except in respect of those requirements referred to at item 16 of the Schedule.</p>	
<p>10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.</p>	
<p>11. This Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.</p>	
<p>12. The marking of the equipment or protective system shall include the following:-</p> <p style="text-align: center;">  II 3 G Ex nA nL IIC T6       </p>	
<p><b>Intertek</b>          1809 10<sup>th</sup> Street, Suite 400          Plano, TX 75074, USA          Tel: (972) 202-8800 Fax: (972) 202-8801  <a href="http://www.intertek.com">http://www.intertek.com</a></p>	<p style="text-align: center;">   <b>Ryan Parks</b>          Hazardous Locations Team Leader          Date: 2009/12/03       </p>
<p style="text-align: center; font-size: small;">This certificate may only be reproduced in its entirety and without any change, schedule included, and is subject to Intertek Testing Services NA, Inc. Testing and Evaluation Terms and Conditions.</p>	
<p>Sheet 1 of 3</p>	
BenchMark ATEX Cert ETL09ATEX41116	12/03/09

**Intertek**



**SCHEDULE**  
**TYPE EXAMINATION CERTIFICATE NUMBER: ETL09ATEX41116**

**13. Description of Equipment or Protective System**

The 2.0 mV/V Load Pin Assembly is a device to translate force or weight into an electrical signal (mV). The internal strain gauges change their electrical resistance in proportion to the strain placed on them. The resulting small signal is amplified and output as a voltage. This unit is constructed from high strength alloys and is powered from a suitable DC power supply -15V & +15V via an 8 or 10 pin military style circular connector.

Connector Pin	Description	
G	CAL	Calibration
F	SIG-	SIG OUT- Amplifier o/p
E	SIG+	SIG OUT+ amplifier o/p
C	-15V	-15V Power rail
D	GND	Power supply 0V.
B	+15V	+15V Power rail

Each 2.0 mV/V Load Pin Assembly has a 1/2-inch load pin, high strength alloy housing containing a 350 Ohm bridge, and a military style twist-lock connector.

**14. Report NUMBER**

Intertek Report 3183344DAL-001, dated 03 December 2009.

**15. Conditions for use:**

**a. Special Conditions for safe use**

There are no special conditions for safe use

**b. Conditions for use (Routine Tests)**

There are no routine tests

**16. Essential Health and Safety Requirements (EHSR's)**

The relevant EHSR's that have not been addressed by the standards listed in this certificate have been identified and assessed in Intertek Report 3183344DAL-001, dated 03 December 2009.

**17. DRAWINGS**

Intertek  
 1809 10<sup>th</sup> Street, Suite 400, Plano, TX 75074, USA  
 Tel: (972) 202-8800 Fax: (972) 202-8801  
<http://www.intertek.com>

Sheet 2 of 3

Benchmark ATEX Cert ETL09ATEX41116

12/03/09

**Intertek**



**SCHEDULE**  
**TYPE EXAMINATION CERTIFICATE NUMBER: ETL09ATEX41116**

Number	Issue	Date	Description
C276A032	B	08/01	Shaft. Load Pin (W/Sleeve)
AMS7M010	F	08/17/00	Load Pin E-1 Converter PCB Housing
AM5KM062	A	02/05	Lid Load Pin Housing
AMTKA013	B	12/18/01	Low Voltage Load Cell Amp Kerr Measurement Systems
AM5KM464	A	07/29/09	Label Load Pin 09ATEX41116 Ex nA
AM5KA067	D	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10 Pin EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA067D
AM5KA072	B	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10P HT EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA072D
AM5KA087	B	08/19/09	Assy Load Pin 2mV/V ½ Dia CWL18 10PIN EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA087D
AM5KA313	B	08/19/09	Assy Load Pin 2mV/V ½ Dia KP 16 8PIN EX 09ATEX41116
Bill of Material	A	08/19/09	Bill of Material AM5KA313D

On the basis of the referenced test report(s), the type sample(s) of the product has(have) been found to comply with the relevant harmonized standard(s) listed on this certificate at the time the tests were carried out.

This Certificate is for the exclusive use of Intertek's client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test/inspection results referenced in this Certificate are relevant only to the type sample tested/inspected. This Certificate by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

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Sheet 3 of 3

Benchmark ATEX Cert ETL09ATEX41116

12/03/09

## 6.5 MARK DETECTOR ATEX Conformity Certificates



### ATEX Conformity Certificate

**Epsilon Certificate Number:**

Epsilon Ex 02ATEX1143

**This certificate is issued for the electrical equipment:**

Magnetic Mark Detector EX

**Manufactured and submitted by:**

Kerr Measurement Systems, Inc.  
 6415 Reading Road  
 Rosenberg  
 Texas 77471  
 USA

**The equipment shall be designed and constructed in accordance with the specification set out in the schedule herein and documents referred to therein.**

**This Certificate is issued subject to the conditions of Epsilon Certification Service and any additional conditions as may be prescribed.**

**This Certificate does not imply that the equipment meets all statutory requirements in any particular industry or circumstance.**

**Directive/s:**  
 ATEX Directive - EU 94/9/EC

**Standard/s**  
 EN 50021:1999

**Coding:**

CE  II 3 G EEx nA II T6

**Epsilon Project Number:**  
ETS0412

**Epsilon Report Number:**  
ETS(A)0412/C/1

**Issue Date:** 22 May 2002

On Behalf of Epsilon Certification Service

  
 S L D'Henin  
 Certification Manager

**This certificate may only be used in its entirety and without change**

*Epsilon Technical Services Limited is certified against the requirements of ISO 9002 for assessment of products against EU Standards and Directives and is accredited for test and inspection by N.A.P.I.T. Epsilon is accredited as a Certification Body by the ASCB(E) (Accreditation Service for Certifying Bodies (Europe)).*







Sheet 1 of 2



AM5KSTD11MAY

Page 56 of 100



## ATEX Certificate Schedule

**Epsilon Certificate Number:**

Epsilon Ex 02ATEX1143

**Equipment Description:**

The magnetic mark detector is a device which makes use of the Hall effect, for the purpose of generating a direct current voltage in the presence of a magnetic field, in this case a 5VDC electrical pulse. This unit operates between 9-30 volts DC with differential signals via a plug and socket arrangement.

**Drawings:**


Number	Rev	Date	Title
98600001	F	April 01	Mark Detector
AM5KM635	A	April 02	Cover Magnetic Mark Detector EX



**Conditions of Certification:**

None


**Special Conditions of Certification:**

None



Epsilon Certification Service Limited  
 Drury Lane, Buckley, Chester CH17 3DU, UK  
 Tel: +44 (0) 1244 541551 Fax: +44(0) 1244 543888  
 E-mail: certification@epsilon-ltd.com



Sheet 2 of 2

## 7.0 RECOMMENDED SPARE PARTS

It is recommended that the following list of parts be kept on hand for remote locations.

ITEM	P/N	DESCRIPTION	QTY	REF
10		ASSY LOAD AXLE	1	SEE CHART
12	AM5KA066	ASSY MAG MARK DETECTOR EEx nA	1	
13		ENCODER	1	SEE CHART
14	AM5KA058	ASSY BACKUP MAGNETIC EEx Na	1	
22	AM5KM001	WHEEL MEASURING 2FT 5 SPOKE	2	
31	AM5KA137	ASSY WHEEL GUIDE PLAS 35MM BRG	4	
33	AM5KA063	ASSY WHEEL TENSN SHALLOW GROOVE	1	
33	AM5KA073	ASSY WHEEL TENSN DEEP GROOVE	1	OPTION (HI TENSION)
34	AM5KA164	ASSY WHEEL TENSN FIXD 35MM BRG	2	
35	AM5KA065	ASSY ROLLER SPOOLNG 2.75" PLAS	4	
36	AM5KM073	COUPLING MOD ENCDR 0.250/0.375	2	
51	AMS1P009	RETAINING PIN (T HANDLE)	1	
54	AM5KM157	BEARING BALL 35MM ID MOD	6	
55	AM5KP088	BEARING LINEAR 30MMID X 40MMOD	8	
56	AM3KP204	BEARING BALL 20MM FAFNIR 204PP	4	
58	AM5KM134	BEARING BALL 40MM ID MOD	1	
59	AM5KP229	CLAMP TOGGLE PUSH/PULL SST	1	
101	AM5KP130	NOZZLE GREASE FITTNG FLUSH	1	

### NOTE 1:

Heads manufactured before Nov 2002 required the shaft to be replaced when the measuring wheels were replaced. All later model heads (SN 5K0229) and after come with keyed shafts that allow the wheel to be replaced without the shaft.

The P/N for wheel and shaft assembly is AM5KA025 (wheel and shaft without magnets - Encoder Wheel 1) and AM5KA060 (wheel and shaft with magnets - Encoder Wheel 2). If these P/Ns are ordered, they will automatically be supplied with the new keyed shafts. From that point forward, the AM5KM001 wheels can be used.

### NOTE 2:

Heads manufactured before Feb 2004 did not have greaseable bearings. We have since created a greaseable version for all 7 wheels. All later model heads (SN 5K0412) and after come with the greaseable bearings.

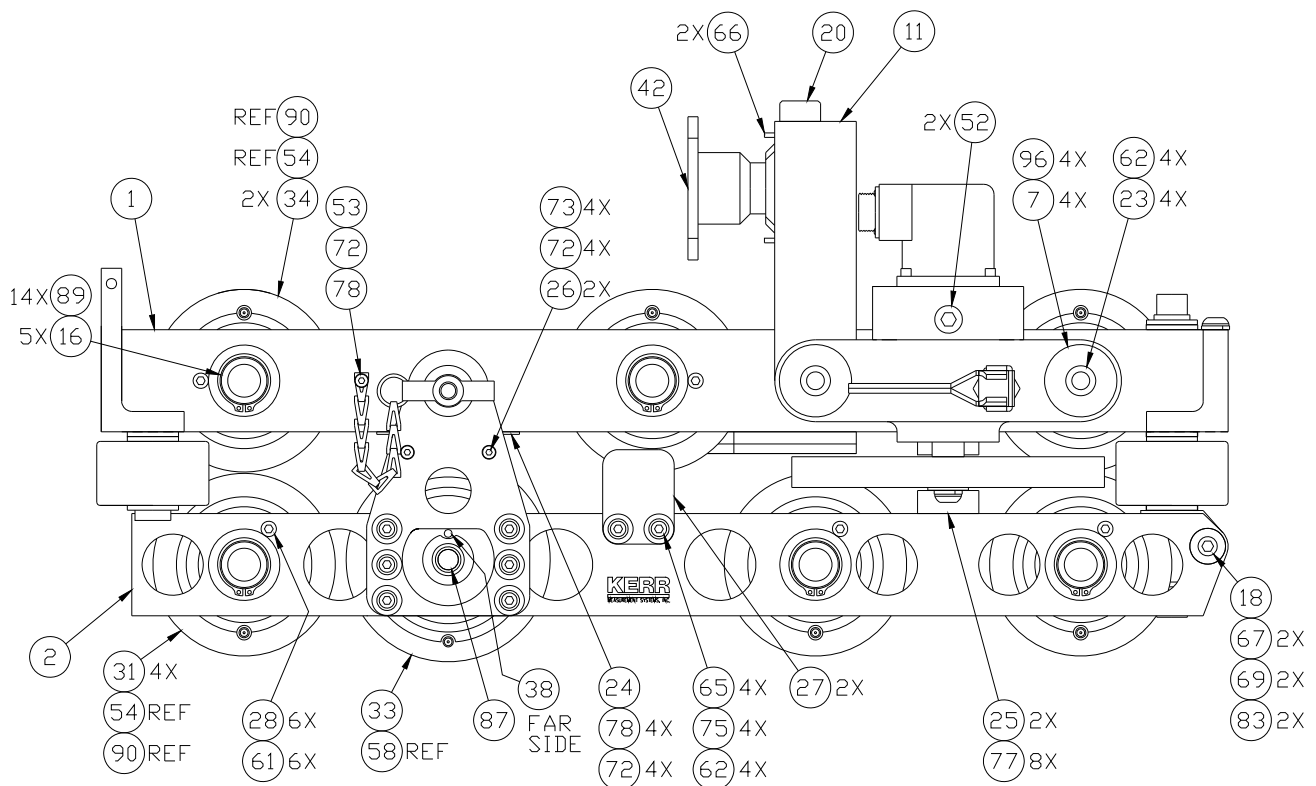
The top 4 wheels on both old and new heads are interchangeable with the new greaseable wheels. The bottom three plastic wheels in the old measuring heads are different then the wheels in new Measuring heads. The diameter of the wheel shaft is 20mm for the old measuring head and 35mm for the new measuring head.

- The P/N for this wheel assembly with the 20mm shaft is AM5KA139
- The P/N for the 20mm shaft only is AM5KM012

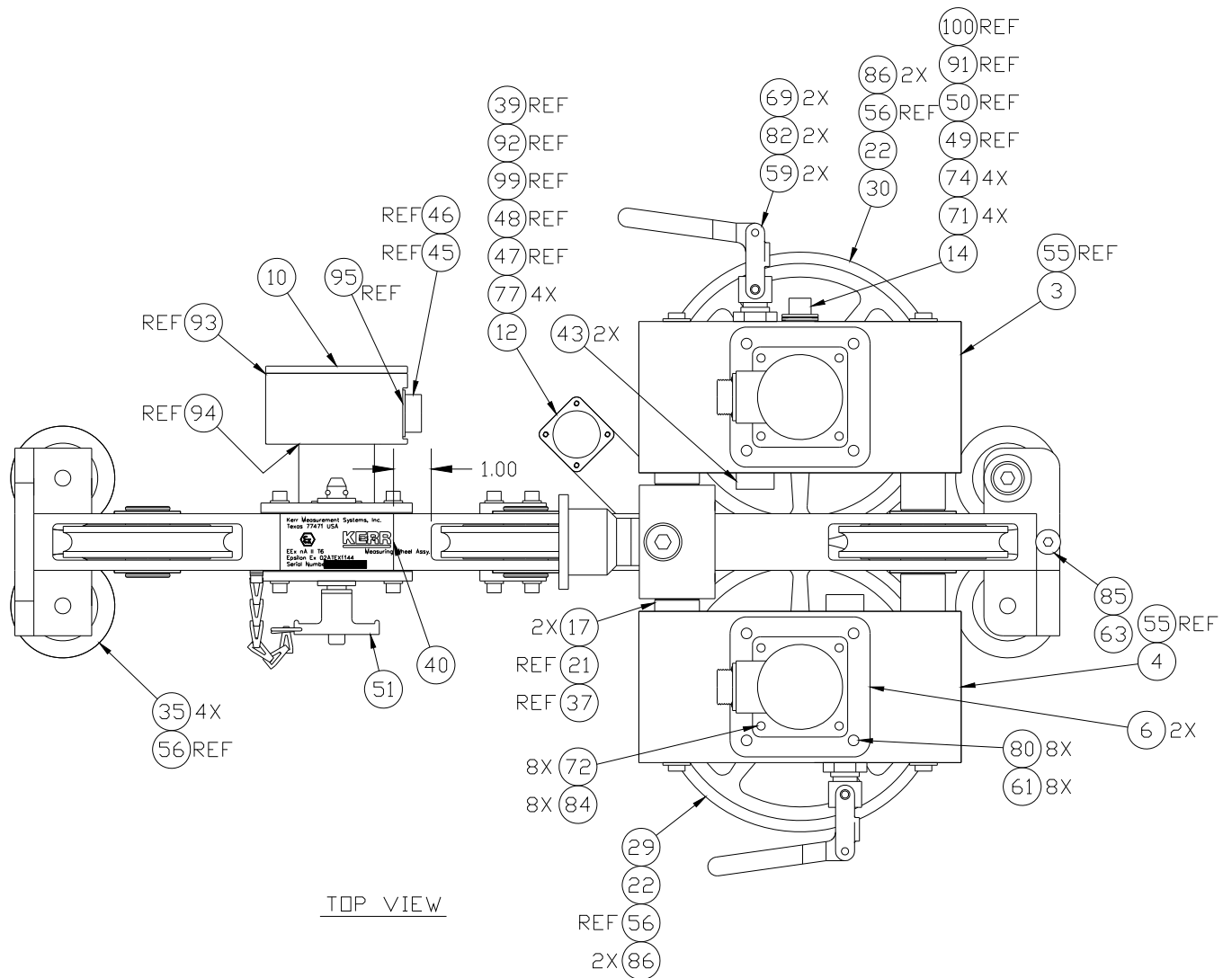
## 8.0 DRAWINGS AND PARTS LISTS

### 8.1 MEASURE HEAD ASSEMBLY

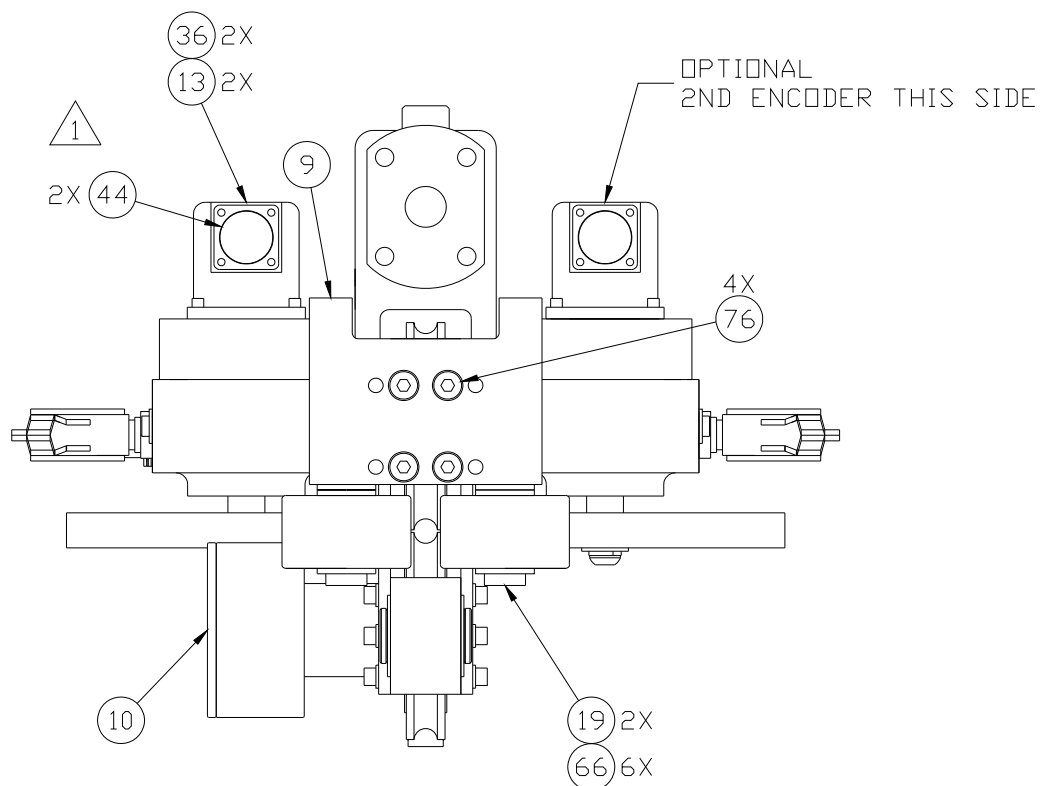
#### AM5K - SIDE VIEW



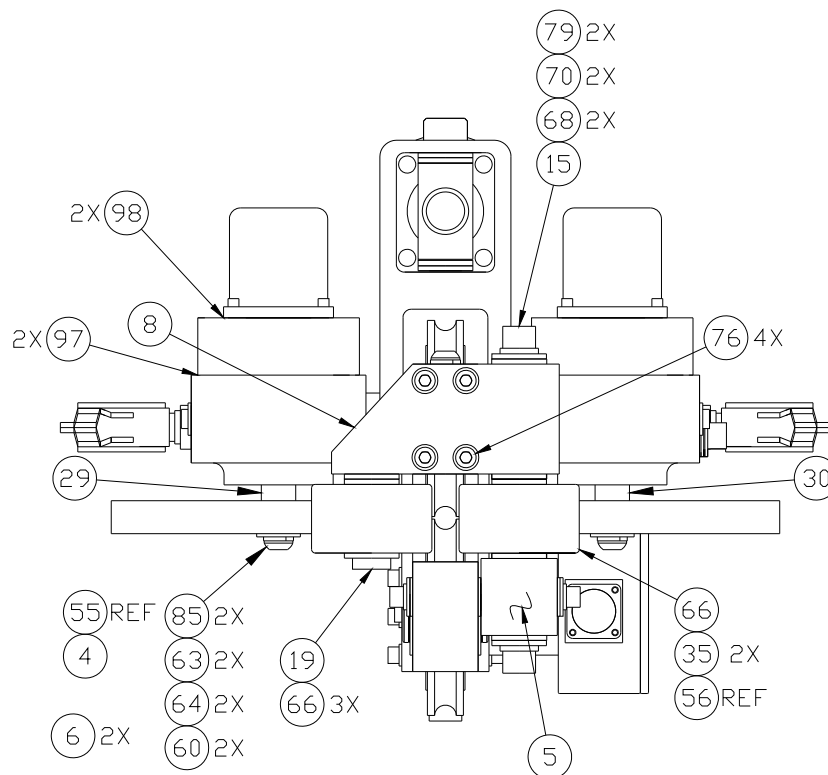
## AM5K - TOP VIEW



## AM5K - FRONT VIEW



## AM5K - REAR VIEW



## PARTS LIST

ITEM	P/N	DESCRIPTION	QTY	REF
1	AM5KA131	ASSY FRAME BACKBONE UPPER W/BUSHINGS	1	
2	AM5KA332	ASSY LOWER FRAME W/BUSHINGS AND WEAR BLOCKS	1	
3	AM5KA052-1	ASSY MOUNT FLTNG ENCDR WHL W/	1	OPTION
4	AM5KA052-2	ASSY MOUNT FLTNG ENCDR WHL W/O	1	
5	AM5KA053	ASSY BLOCK PIVOT HORIZ/VERT	1	
6	AM5KM057	ADAPTER ENCODER H37C/H25D	2	OPTION
6	AM5KM058	COVER ENCODER ADAPTER	1	OPTION
7	AM5KM020	ENDCAP FLOATING ENCODER MOUNT	4	
8	AM5KA057	ASSY MOUNT SPOOLNG ROLLR FRNT	1	
9	AM5KM026	MOUNT SPOOLING ROLLER REAR	1	
10		ASSY LOAD AXLE	1	SEE CHART
11	AM5KA040	ASSY MOUNT CENTER YOKE 5 WHEEL	1	OPTION
12	AM5KA066	ASSY MAG MARK DETECTOR EEx Na	1	
13		ENCODER	1	SEE CHART
14	AM5KA058	ASSY BACKUP MAGNETIC EEx Na	1	
15	AM5KM024	SHAFT PIVOT VERTICAL 20MM SST	1	
16	AM5KM011	SHAFT TENSION ROLLER 30MM SST	5	
17	AM5KA059	ASSY SHAFT ENCODER SLIDE 30MM	2	
18	AM5KM023	SHAFT PIVOT HORIZONTAL 1/2 SST	1	
19	AM5KM013	SHAFT SPOOLING ROLLER 20MM	3	
20	AM5KP023	BOLT SHOULDER 3/4 X 3 SST	1	
21	AM5KP002	SPRING EXT 4" OAL 47/64 DIA SST	4	
22	AM5KM001	WHEEL MEASURING 2FT 5 SPOKE	2	
23	AM5KM141	ANCHOR SPRING 1/2" FLOATING	4	
24	AM5KM034	PLATE WEAR 1/16 X 1.5 X 3.5	1	
25	AM5KM049	BLOCK WEAR 1.50 X 1.50 X 0.56 STL	2	LARGE LINES
25	AM5KM074	BLOCK WEAR UPPER TOOL STL CH	1	SMALL LINES ONLY
26	AM3KM134	BLOCK WEAR 0.75 X 2.50 TOOLSTL	2	
27	AM5KM159	BLOCK GUIDE TENSION WHEEL PLAS	2	
28	AM5KM084	SCREW ANTI-ROTATION TENS WHEEL	6	
29	AM5KM010	SHAFT WHEEL CANTILEVERED 5 WHL	1	
30	AM5KM060	SHAFT WHEEL CANTLVRD MAG 5 WHL	1	OPTION
31	AM5KA137	ASSY WHEEL GUIDE PLAS 35MM BRG	4	
33	AM5KA063	ASSY WHEEL TENSN SHALLOW GRV	1	OPTION
33	AM5KA073	ASSY WHEEL TENSN DEEP GRV	1	OPTION (HI TENSION)
34	AM5KA164	ASSY WHEEL TENSN FIXD 35MM BRG	2	
35	AM5KA065	ASSY ROLLER SPOOLNG 2.75" PLAS	4	
36	AM5KM073	COUPLING MOD ENCDR 0.250/0.375	2	OPTION
37	AM5KP124	PIN COILED SPRING 1/4 X 1-1/8	2	ENCODER SLIDE
38	AM5KP125	PIN COILED SPRING 3/16 X 1/2	1	TENSION WHEEL PIN
42	AM5KM138	YOKE PIVOT CENTER MOUNT SST	1	
43	AM5KM040	PUSHROD TOGGLE CLAMP PLASTIC	2	
51	AMS1P009	RETAINING PIN (T HANDLE)	1	
52	AMS1P072	PLUG 3/8 NPT SS	2	

53	AM5KP075	CHAIN SASH #35 SST	6	
54	AM5KM157	BEARING BALL 35MM ID MOD	6	
55	AM5KP088	BEARING LINEAR 30MMID X 40MMOD	8	
56	AM3KP204	BEARING BALL 20MM FAFNIR 204PP	4	
58	AM5KM134	BEARING BALL 40MM ID MOD	1	
59	AM5KP229	CLAMP TOGGLE PUSH/PULL SST	2	
60	AM5KM055	KEY 1/8 X 1/8 X 0.625L SST	2	
61	AM5KP144	WASHER 1/4 LOCK SS HIGH COLLAR	4	
62	ACMU2P31	WASHER 1/4 FLAT SS	8	
63	AMS1P058	WASHER 3/8 LOCK SS	3	
64	C276P513	WASHER 3/8 FLAT SST	2	
65	C276P036	WASHER 1/4 LOCK SS	4	
66	AM5KP011	WASHER 20MM FLAT SST	12	
67	C276P039	WASHER 5/16 FLAT SST	2	
68	AMS1P066	WASHER 1/2 LOCK SS	2	
69	AMS1P047	WASHER 5/16 LOCK SS	4	
70	C276P037	WASHER 1/2 FLAT SST	2	
71	C276P046	WASHER #6 LOCK SS	4	
72	C276P035	WASHER #10 LOCK SS	7	
73	AMS1P052	SCREW 10-24 X 5/8 SOC HD SST	4	
74	C276P331	SCREW 6-32 X 1/2 PHIL PAN SST	4	
75	AM5KP117	SCREW 1/4-20 X 5/8 BTN HD SST	4	
76	AM5KP038	SCREW 5/16-18 X 7/8 FH SOC SS	8	
77	AM5KP039	SCREW 10-24 X 7/8 FH SOC SST	2	
78	AM5KP040	SCREW 10-24 X 3/8 SOC HD SST	5	
79	AM5KP042	SCREW 1/2-13 X 3/4 SOC HD SST	2	
80	AMS1P048	SCREW 1/4-20 X 3/4 SOC HD SST	4	OPTION W/COVER
80	C276P031	SCREW 1/4-20 X 1-1/4 SOC HD SS	8	
82	AM5KP037	SCREW 5/16-18 X 4-1/2 SOC HD	2	
83	AM3KP028	SCREW 5/16-18 X 1/2 SHCS SST	2	
84	AMS1P052	SCREW 10-24 X 5/8 SOC HD SST	8	OPTION
84	AMS1P053	SCREW 10-24 X 2 SHCS SST	8	OPTION W/HD ENCDR
85	AM5KP043	SCREW 3/8-16 X 1/2 BUTTON HD	3	
86	AMS1P006	RING RETNG INT UR187S	4	
87	AM5KP033	RING RETNG EXT 0.500 SHAFT SST	1	
89	AM3KP018	RING RETNG EXT 1.188 SHAFT SST	14	
90	AM5KP168	RING RETNG INT 2.875 LT DUTY	12	
91	C276P041	O-RING 2-017 BUNA N	1	BACKUP HSG
92	AM5KP072	O-RING 2-046 BUNA N MMD COVER	1	
93	C276P040	O-RING 2-235 BUNA N L/P LID	1	
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG	1	
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN	1	
96	AM5KP020	O-RING 2-030 BUNA N ENDCAP	4	
97	AMS1P014	O-RING 2-152 BUNA N ENC ADPTR	2	
98	AM5KP071	O-RING 2-141 BUNA N H25 ENCDR	2	
99	AM5KP119	O-RING 2-026 BUNA N MMD CONN	1	
100	C276P042	O-RING 2-016 BUNA N	1	BACKUP CONN
101	AM5KP130	NOZZLE GREASE FITNG FLUSH	1	NOT SHOWN

## **8.2 MMD - MAGNETIC MARK DETECTOR SPECIFICATION**

### **1. General**

This specification describes the latest magnetic mark detector. It replaces the original AMS100 detector, p/n AMS1A003. The performance characteristics emulate the original unit.

### **2. Mechanical**

The mark detector will work in both the original housing p/n AMS1M022 and the AM5K versions using p/n AM5KM029. The pc board is potted to prevent damage from shock, vibration, or humidity.

### **3. Power**

Input power is 9 - 30vdc at 100ma max.

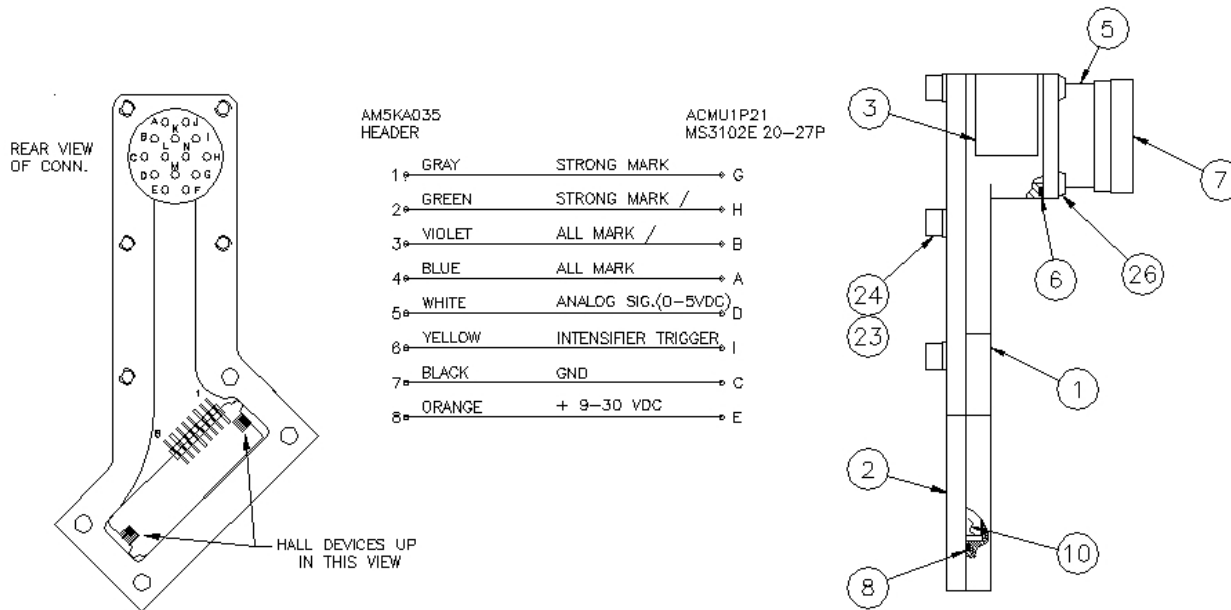
### **4. Outputs**

Digital line driver out for strong & strong\ and also weak & weak\ where a weak mark is 4 gauss or less and a strong mark is greater than 4.1 gauss measured 0.10 inch from cable surface. The signals are a +5vdc digital pulse. A digitized 0-5vdc representation of the analog signal is provided.

### **5. Performance**

- a) Operating temperature -40 to +120 f. compensated and stable. Storage temperature -60 to +180 f.
- b) Magnetic mark detection at cable line speeds of 1 to 1000 feet per minute.
- c) Auto cal feature removes offset of the electronics and any constant magnetic field less than 1 gauss every 100ms. If in a greater field, it will auto calibrate every 11 seconds.
- d) Detection of apparent zero gauss (at high/low crossing) is within 0.1 inch and repeatable so as any error is not accumulative.
- e) Will survive a gauss level exposure of 60 gauss.

## 8.2 MMD continued



## AM5KA066 ASSY MMD EEx nA

ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AM5KM029	ENCLSR MAGNETIC MARK DETECTOR	1	EA
2	AM5KM035	COVER MAGNETIC MARK DETECTOR	1	EA
5	ACMU1P21	CONN MS3102E-20-27P 14 PIN RECEPT	1	EA
6	AM5KP119	O-RING 2-026 BUNA N MMD CONN 1-1/4 X 1-3/8 X 1/16	1	EA
7	ACMU1P22	DUST CAP MS25D43-20DA	1	EA
8	AM5KP072	O-RING 2-046 BUNA N MMD COVER 4.239ID X 4.3790D X 0.070	1	EA
10	AM5KA035	PCB MMD POTTED, AM5K OR AMS100	1	EA
23	C276P035	WASHER #10 LOCK SS	5	EA
24	AMS8P029	SCREW 10-24 X 1/2 SOC HD SST	5	EA
26	AMS1P040	SCREW 6-32 X 3/8 PAN HD SST	4	EA

### 8.3.1 LOAD PIN - AM5KA013 OR AM5KA067

#### TENSION SPECIFICATIONS:

Power Requirements: 12 vdc excitation

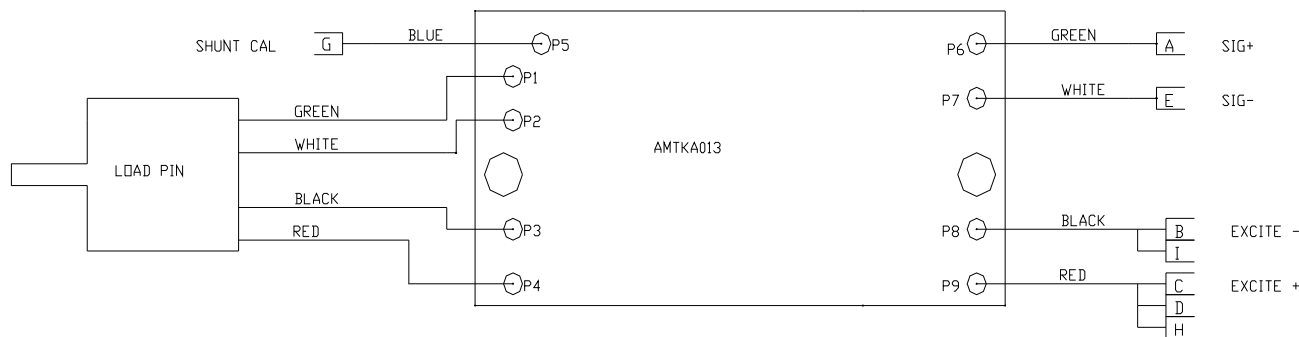
Proprietary circuit board which buffers the load pin signals and provides a 3mv/v output

Temperature stability:  $\leq$  .015% full scale / deg F on zero

$\leq$  .02% full scale / deg F on output

Within 150 lbs or 3% of actual, whichever is greater

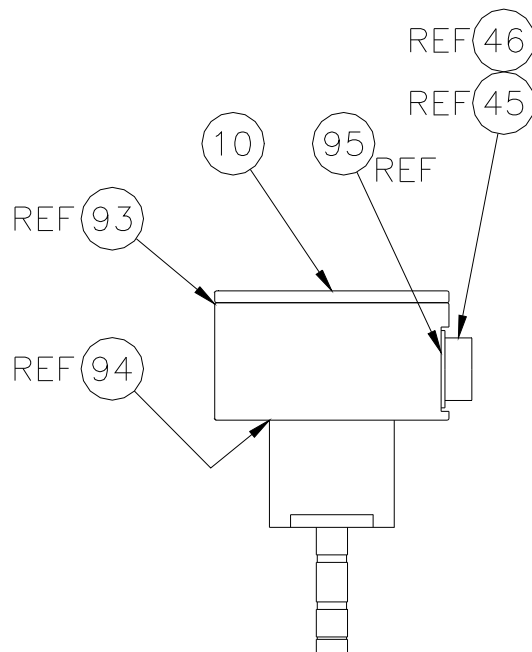
Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



***Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage***

***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

### 8.3.1 LOAD PIN - AM5KA013 OR AM5KA067 continued



### AM5KA067 ASSY LOAD AXLE 3MV/V

ITEM	P/N	DESCRIPTION	QTY	UNIT
45	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THD 10 PIN	1	EA
46	AM5KP067	DUST CAP CW49N16C CANNON CWL COURSE THREAD	1	EA
93	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA

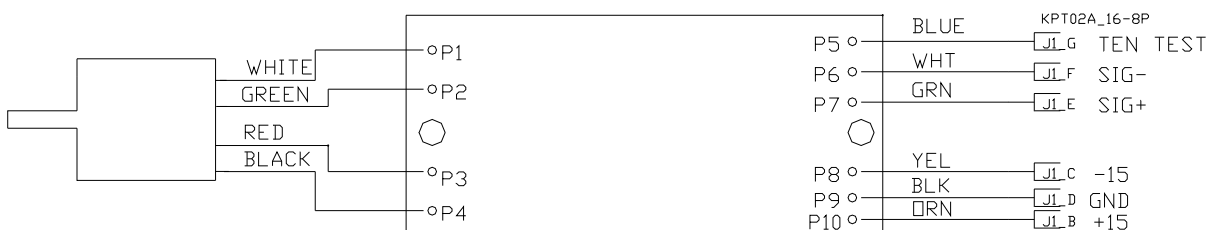
### TENSION SPECIFICATIONS:

Proprietary circuit board which amplifies the load pin signals and provides a 1.5v differential output.

Temperature stability:

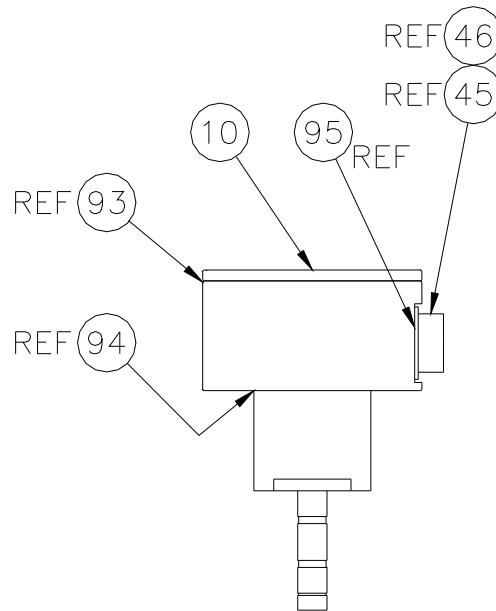
<=	.015% full scale / deg F on zero
<=	.02% full scale / deg F on output

Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



**WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED**

### 8.3.2 LOAD PIN - AM5KA069 OR AM5KA010 continued



### AM5KA069 ASSY LOAD AXLE 1.5 V DIFFERENTIAL Ex

ITEM	P/N	DESCRIPTION	QTY	REF
45	AMS8P055	CONN KPT 02A16-8P	1	EA
46	AMS8P056	DUST CAP KPT81-16C	1	EA
10	AMTKA014B	PCB ASSY 0-1.5V DIFF LP EX	1	EA
93	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA

### 8.3.3 LOAD PIN - AM5KA071

#### TENSION SPECIFICATIONS:

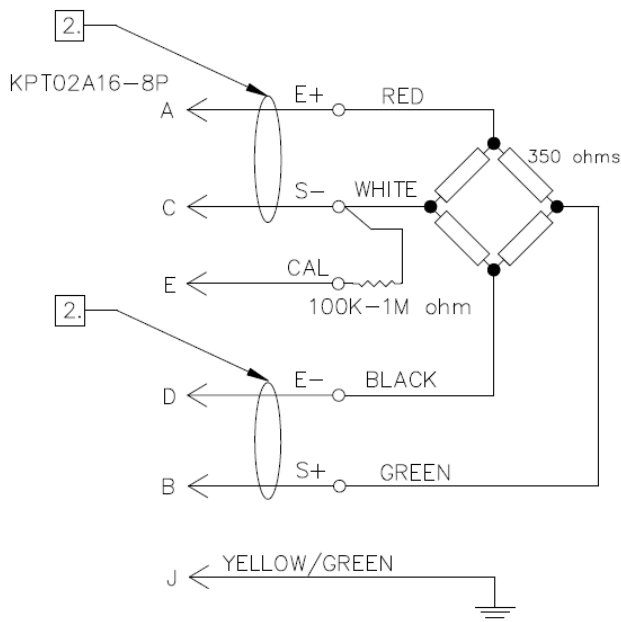
Power Requirements: 12 vdc excitation

Proprietary circuit board which buffers the load pin signals and provides a 3mv/v output

Temperature stability:  $\leq$  .015% full scale / deg F on zero  
 $\leq$  .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

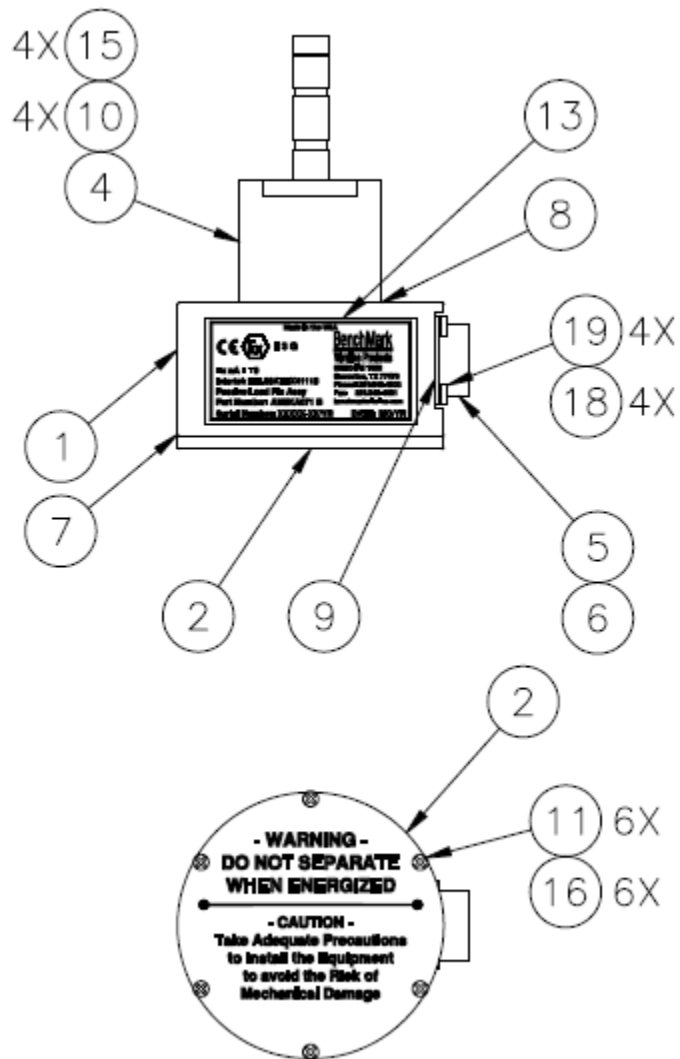
Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



**Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage**

**WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED**

### 8.3.3 LOAD PIN - AM5KA071 continued



### 8.3.3 LOAD PIN - AM5KA071 continued

ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AMTKA013	ASSY PCB LOW LEVEL TENSION	1	EA
3	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AM5KP104	PIN LOAD 3000# 1/2 OD 2.0 MV/V	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
12	AM5KP228	STANDOFF 4-40 X 1/2 M/F HEX	2	EA
13	C276P035	WASHER #10 LOCK SS	4	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
17	AMS8P090	WASHER #4 FLAT SST	6	EA

### 8.3.4 LOAD PIN - AM5KA078

#### TENSION SPECIFICATIONS:

Power Requirements: 12 vdc excitation

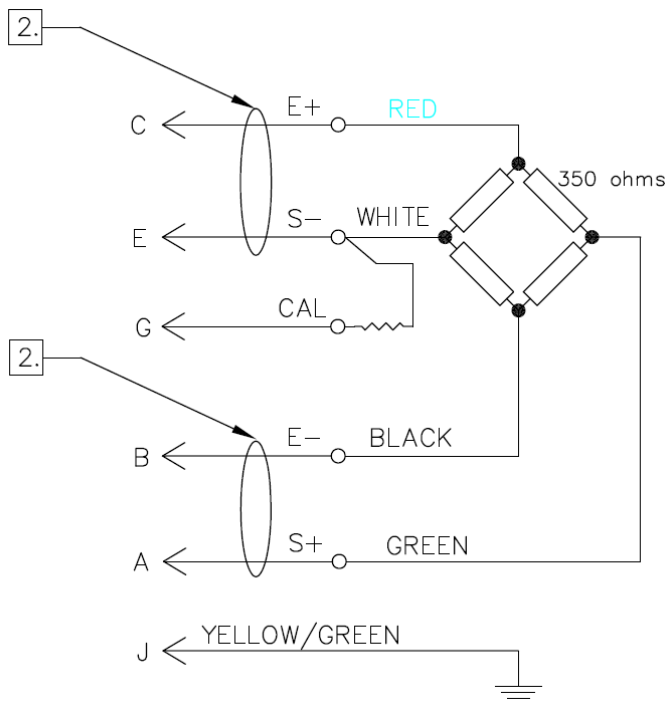
Proprietary circuit board which buffers the load pin signals and provides a 3mv/v output

Temperature stability:  $\leq$  .015% full scale / deg F on zero

$\leq$  .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

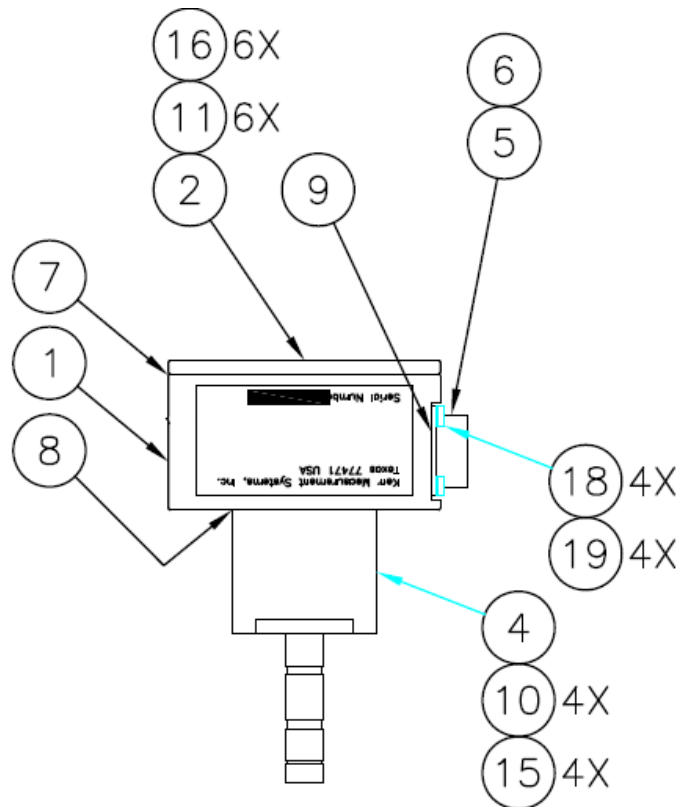
Maximum load (tested): 25,000 lbs 11,340 kg  
 (with deep grooved tension wheel)



**Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage**

**WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED**

### 8.3.4 LOAD PIN - AM5KA078 continued



### AM5KA078 ASSY LOAD AXLE 3MV/V

ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AMTKA013	ASSY PCB LOW LEVEL TENSION	1	EA
4	AM5KP104	PIN LOAD 3000# 1/2 OD 2.0 MV/V	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA

### 8.3.5 LOAD PIN - AM5KA087

#### TENSION SPECIFICATIONS:

Power Requirements: 12 vdc excitation

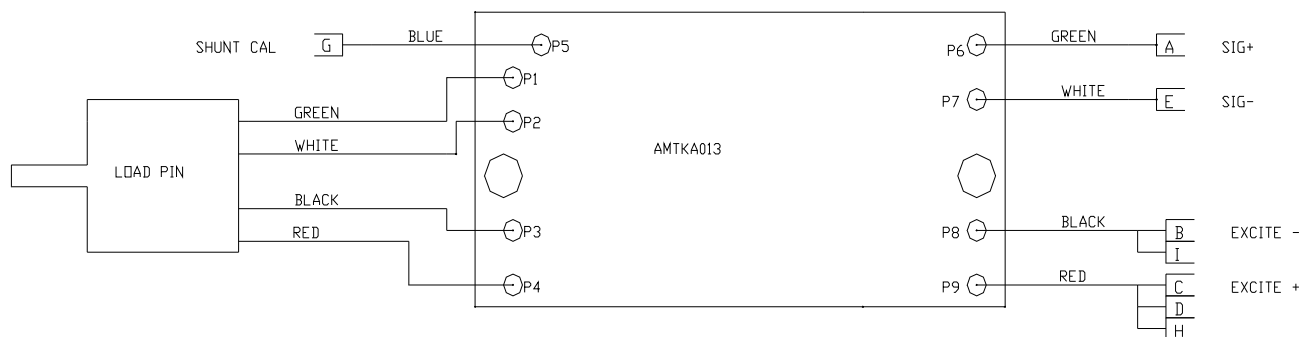
Proprietary circuit board which buffers the load pin signals and provides a 3mv/v output

Temperature stability:  $\leq$  .015% full scale / deg F on zero

$\leq$  .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

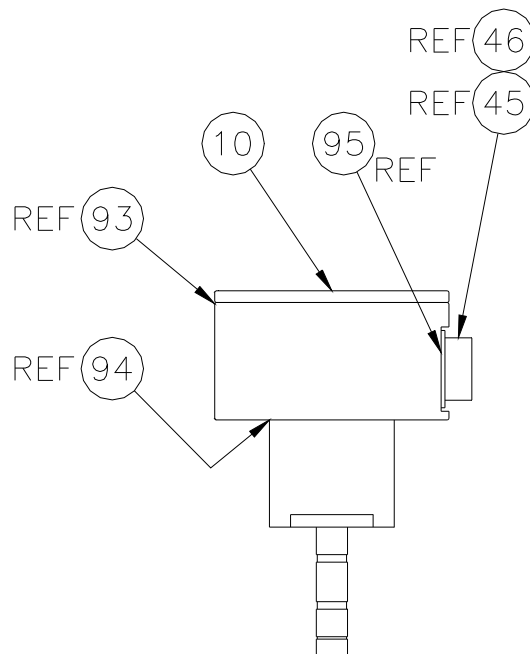
Maximum load (tested): 25,000 lbs 11,340 kg  
 (with deep grooved tension wheel)



***Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage***

***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

### 8.3.5 LOAD PIN - AM5KA087 continued



### AM5KA087 ASSY LOAD AXLE 3MV/V

ITEM	P/N	DESCRIPTION	QTY	UNIT
45	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THD 10 PIN	1	EA
46	AM5KP067	DUST CAP CW49N16C CANNON CWL COURSE THREAD	1	EA
93	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA

### 8.3.6 LOAD PIN - AM5KA313

#### TENSION SPECIFICATIONS:

Power Requirements: 12 vdc excitation

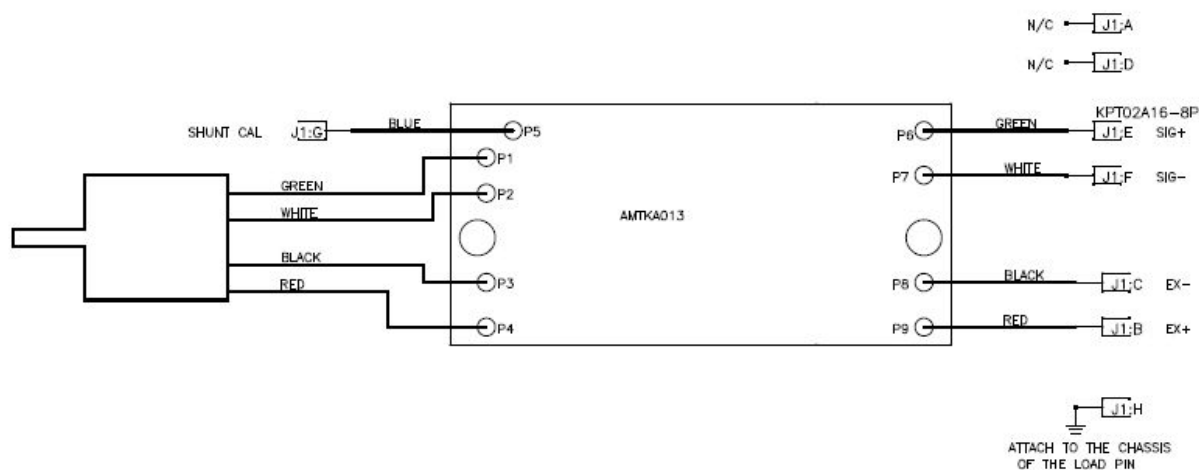
Proprietary circuit board which buffers the load pin signals and provides a 3mv/v output

Temperature stability: <= .015% full scale / deg F on zero

<= .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

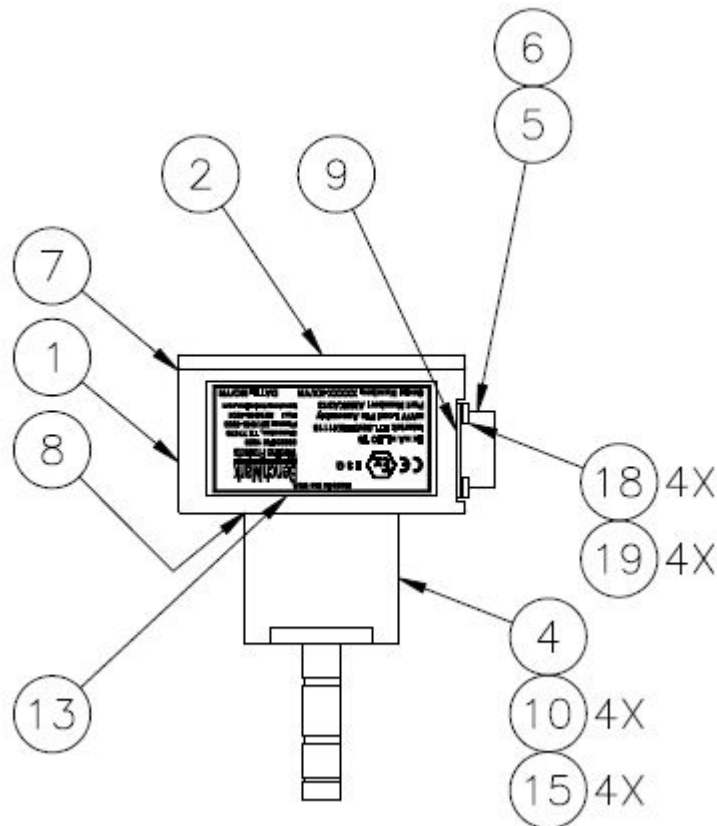
Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



***Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage***

***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

### 8.3.6 LOAD PIN - AM5KA313 continued



ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AMTKA013	ASSY PCB LOW LEVEL TENSION	1	EA
3	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AM5KP104	PIN LOAD 3000# 1/2 OD 2.0 MV/V	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
12	AM5KP228	STANDOFF 4-40 X 1/2 M/F HEX	2	EA
13	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
17	AMS8P090	WASHER #4 FLAT SST	6	EA

### 8.3.7 LOAD PIN - AM5KA420

#### TENSION SPECIFICATIONS:

Power Requirements: +24 vdc input power

BenchMark proprietary circuit board which amplifies the strain gauge signal and provides a 4-20ma current loop output.

4 ma = 0 lbs (0kg)

12 ma = 10,000 lbs (4,536 kg) – shunt cal

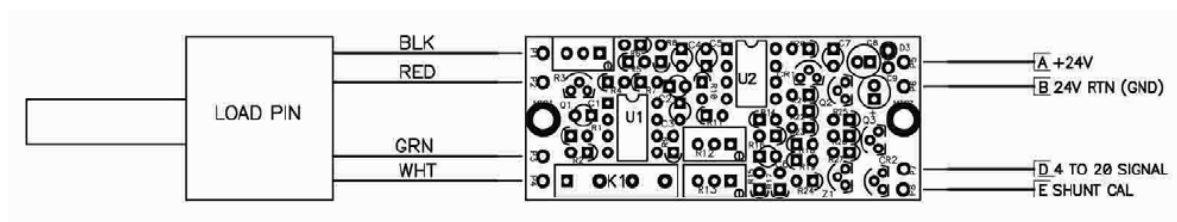
20 ma = 20,000 lbs (9,072 kg)

Temperature stability: <= .015% full scale / deg F on zero

<= .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

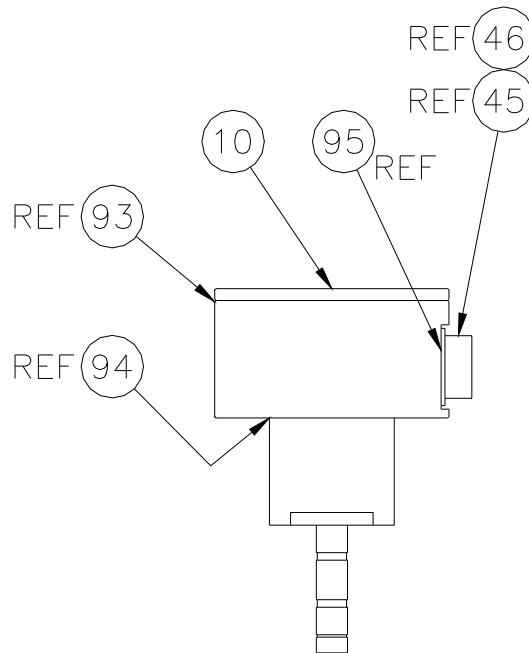
Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



***Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage***

***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

### 8.3.7 LOAD PIN - AM5KA420 continued



### AM5KA420 ASSY LOAD AXLE 3MV/V

ITEM	P/N	DESCRIPTION	QTY	UNIT
45	AM5KP068	CONN MS3102E-18-9P	1	EA
46	AM5KP067	DUST CAP MS25042-18DA	1	EA
93	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA

### 8.3.8 LOAD PIN - AM5KA573 OR AM5KP103

#### TENSION SPECIFICATIONS:

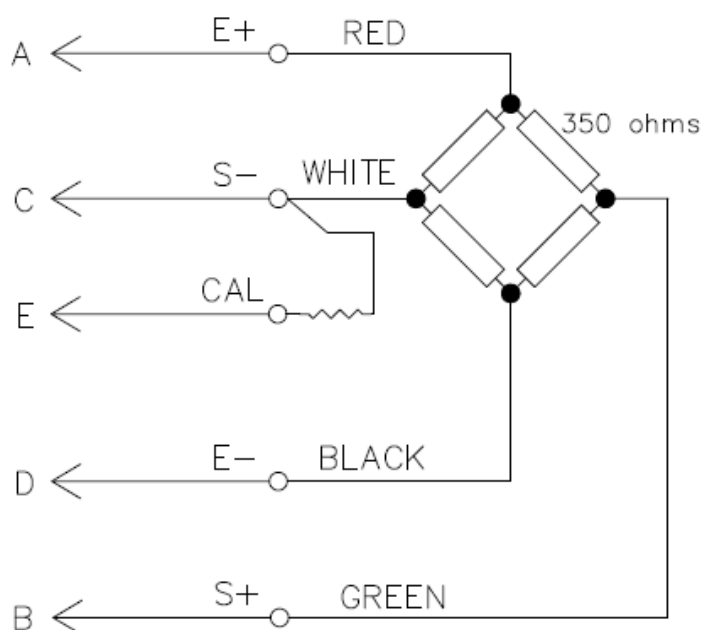
Power Requirements: 12 vdc excitation

Temperature stability:  $\leq$  .015% full scale / deg F on zero

$\leq$  .02% full scale / deg F on output

Accuracy: Within 150 lbs or 3% of actual, whichever is greater

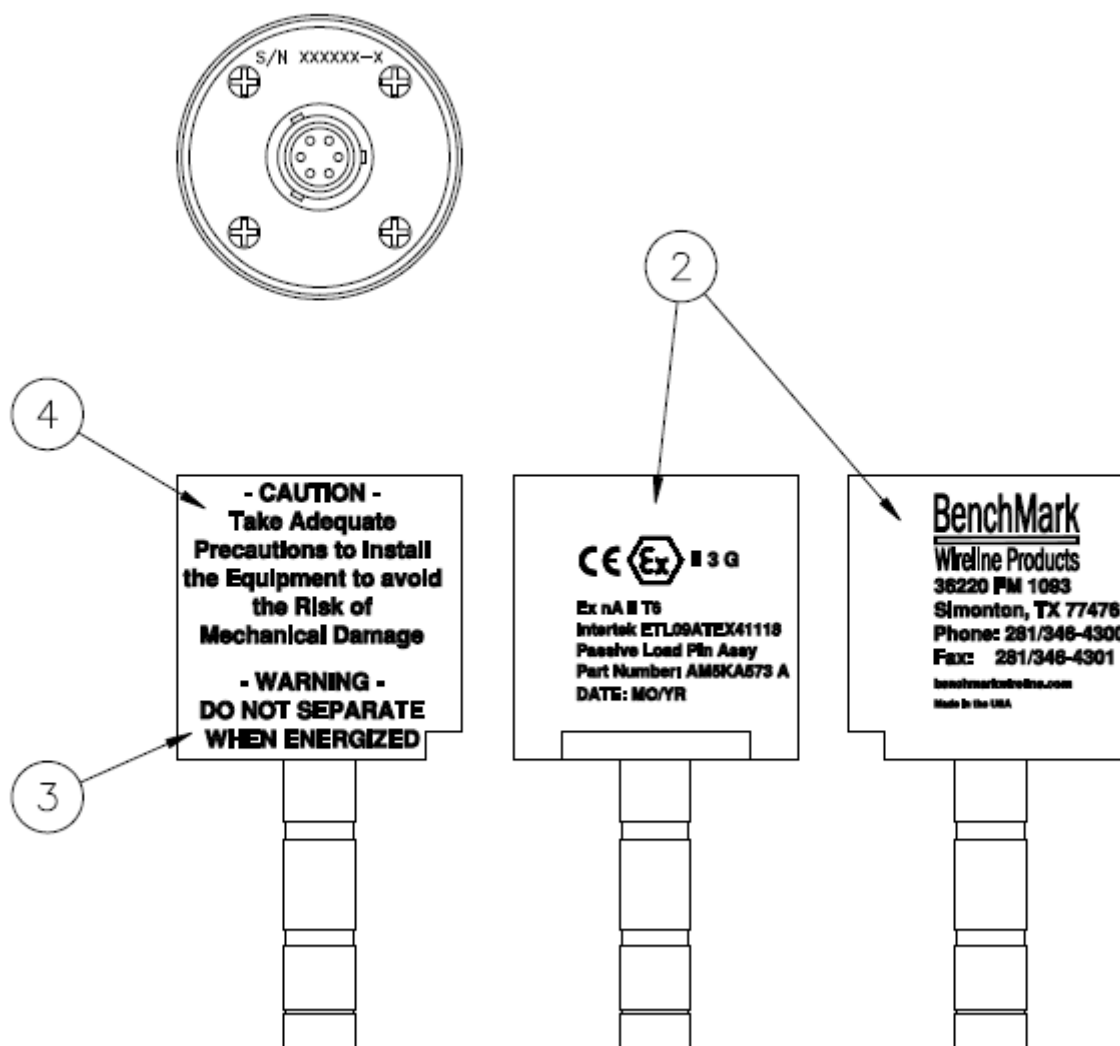
Maximum load (tested): 25,000 lbs 11,340 kg  
(with deep grooved tension wheel)



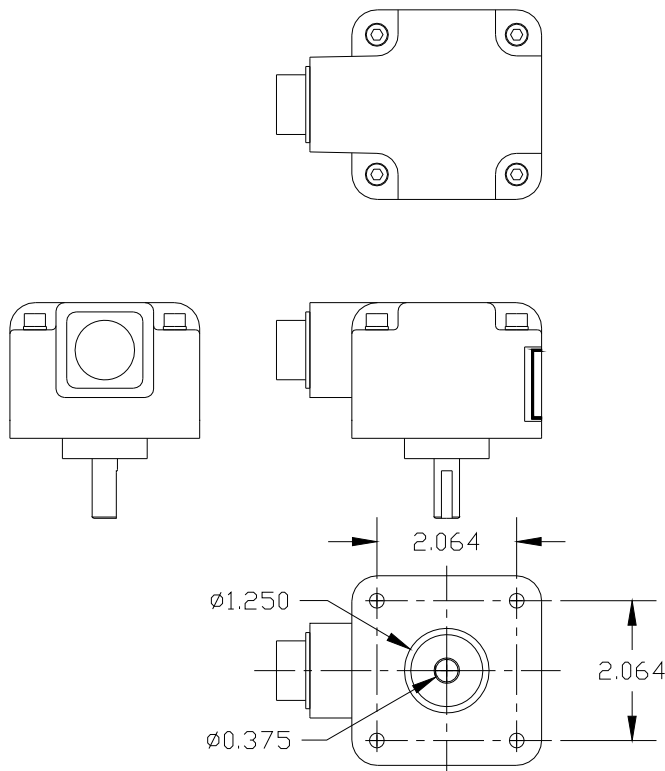
***Take Adequate Precautions when Installing the Load Pin to Avoid the Risk of Mechanical Damage***

***WARNING – DO NOT SEPARATE CONNECTORS WHEN ENERGIZED***

### 8.3.8 LOAD PIN - AM5KA573 OR AM5KP103 continued



## 8.4.1 ENCODER - AM3KP161



P/N	DESCRIPTION	QTY	UNIT
AM3KP161	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

### Specifications

**120 Pulses per revolution**

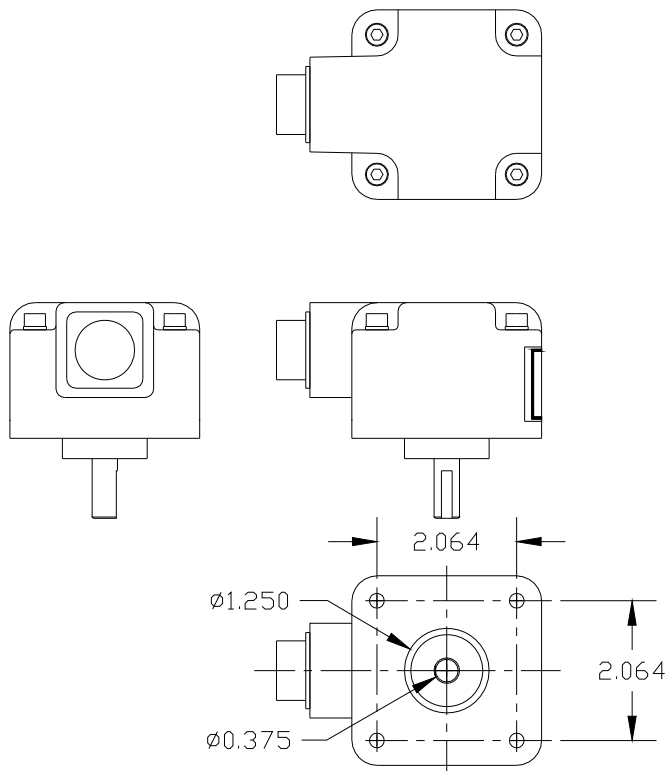
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.2 ENCODER - AM5KA068



P/N	DESCRIPTION	QTY	UNIT
AM5KP161	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

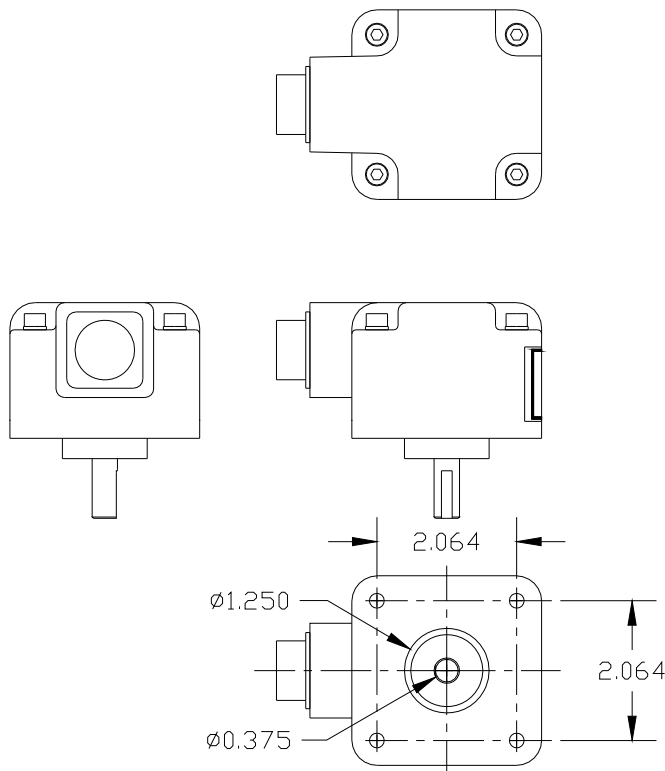
### Specifications

**1200 Pulses per revolution**  
**+5 to +15 vdc power**  
**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

E	-	A
C	-	A\
G	-	B
D	-	B\
A	-	+5 to +15 vdc
B	-	Gnd
F	-	Case

## 8.4.3 ENCODER - AM5KA070



ITEM	P/N	DESCRIPTION	QTY	UNIT
13	AM5KP163	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
36	AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
44	AMS1P071	DUST CAP MS25043-16DA (HES)	2	EA

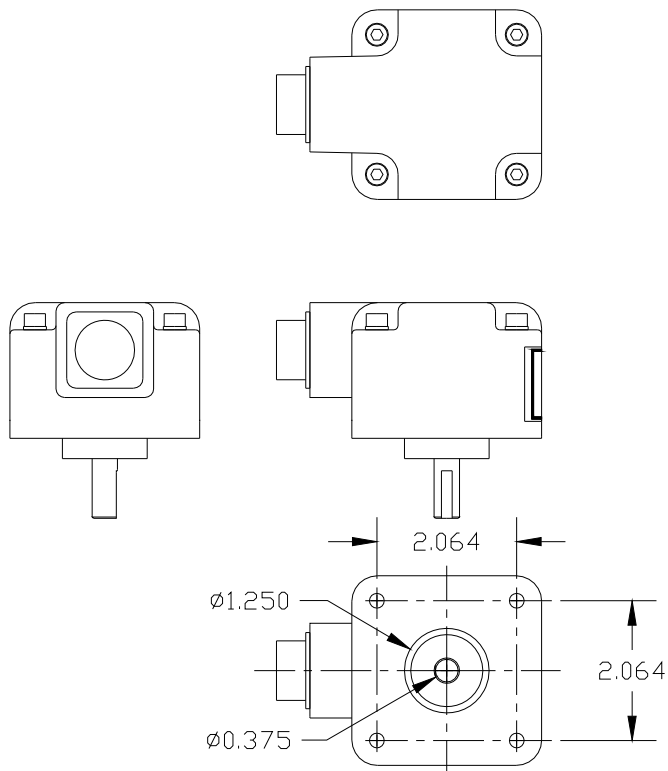
### Specifications

**1200 Pulses per revolution**  
**+5 to +15 vdc power**  
**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

#### 8.4.4 ENCODER - AM5KA074



P/N	DESCRIPTION	QTY	UNIT
AMSLP061	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

#### Specifications

**1200 Pulses per revolution**

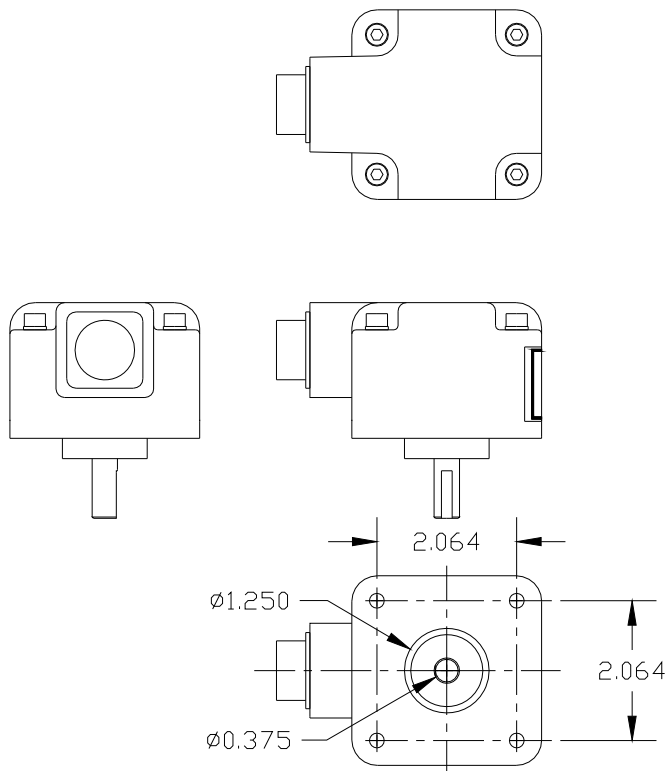
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

#### Pin Out

<b>A</b>	-	<b>A</b>
<b>H</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>I</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.5 ENCODER - AM5KA079



P/N	DESCRIPTION	QTY	UNIT
AM5KP188	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

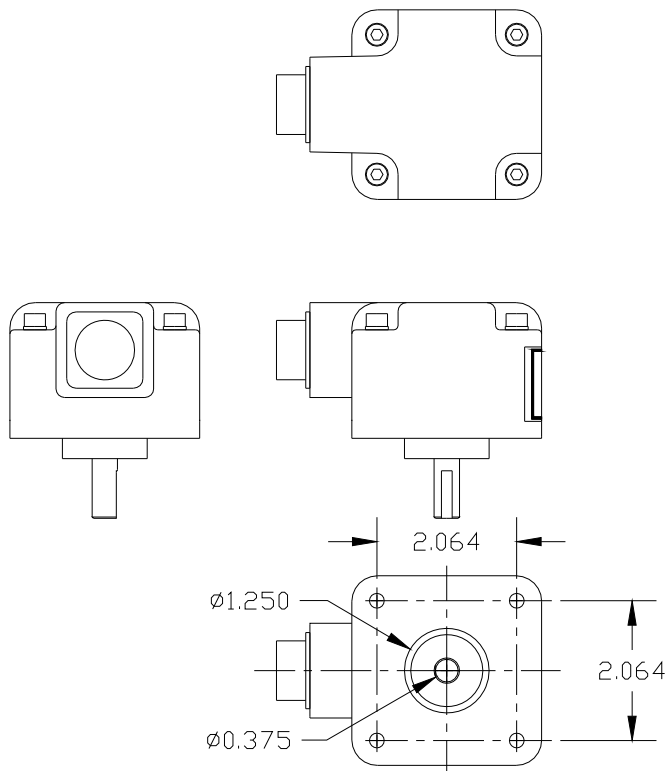
### Specifications

**1200 Pulses per revolution**  
**+5 to +15 vdc power**  
**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

E	-	A
C	-	A\
G	-	B
D	-	B\
A	-	+5 to +15 vdc
B	-	Gnd
F	-	Case

## 8.4.6 ENCODER - AM5KA080



P/N	DESCRIPTION	QTY	UNIT
AM5KP192	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

### Specifications

**1200 Pulses per revolution**

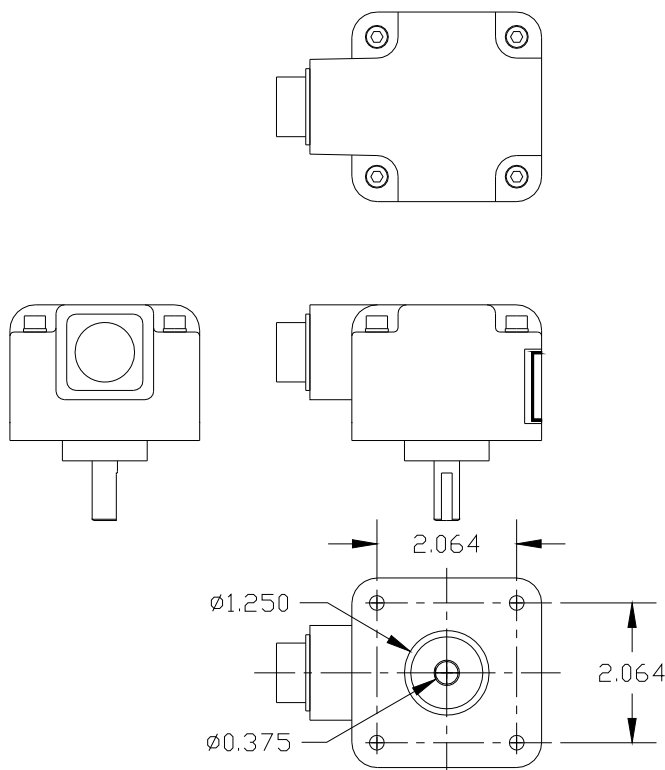
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.7 ENCODER - AM5KP161



P/N	DESCRIPTION	QTY	UNIT
AM5KP161	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

### Specifications

**1200 Pulses per revolution**

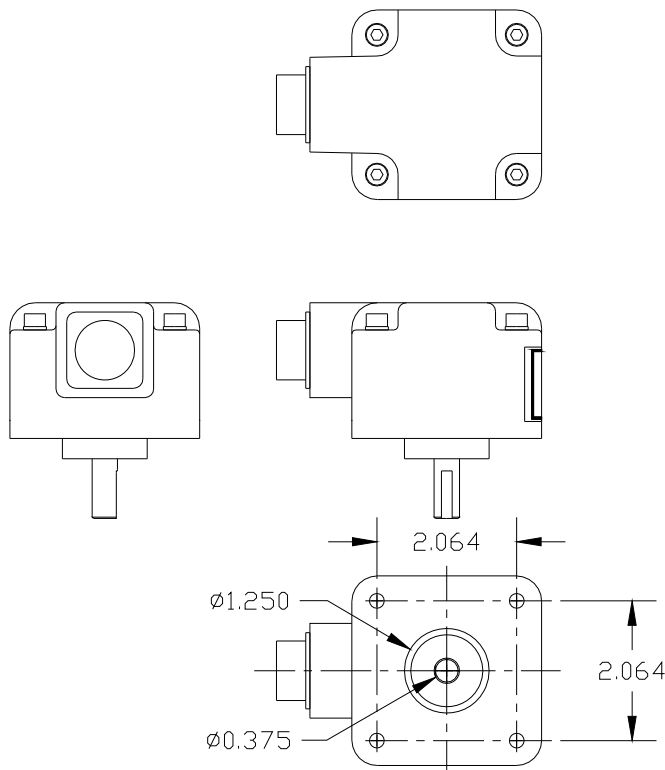
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

#### Pin Out

<b>E</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>G</b>	-	<b>B</b>
<b>D</b>	-	<b>B\</b>
<b>A</b>	-	<b>+5 to +15 vdc</b>
<b>B</b>	-	<b>Gnd</b>
<b>F</b>	-	<b>Case</b>

## 8.4.8 ENCODER - AM5KP163



P/N	DESCRIPTION	QTY	UNIT
AM5KP163	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
ACMU2P09	DUST CAP MS25043-18DA	2	EA
AMS1P053	10-24 X 2" SOCKET HEAD CAP SCREWS SST ENCODER MOUNTING	4	EA

### Specifications

**512-780 Pulses per revolution – Dual Resolution**

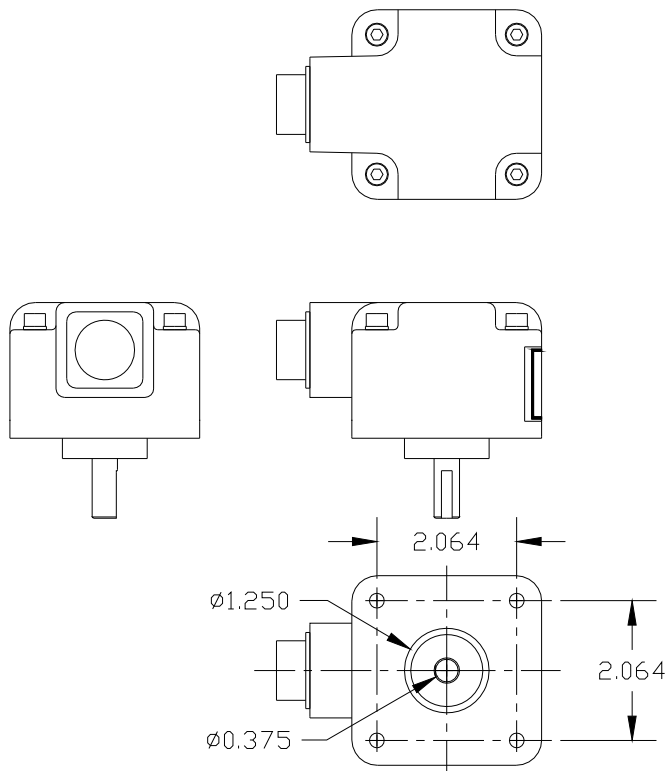
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

#### Pin Out

A	-	A
C	-	A\
B	-	B
E	-	B\
D	-	+5 to +15 vdc
F	-	Gnd
G	-	Case

## 8.4.9 ENCODER - AM5KP164



P/N	DESCRIPTION	QTY	UNIT
AM5KP164	ENCODER IS25-HA-37F-1200-ABC-69-S-16-15 ATEX EEx ia IIB T4	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
ACMU2P09	DUST CAP MS25043-18DA	2	EA
AMS1P053	10-24 X 2" SOCKET HEAD CAP SCREWS SST ENCODER MOUNTING	4	EA

### Specifications

**1200 Pulses per revolution**

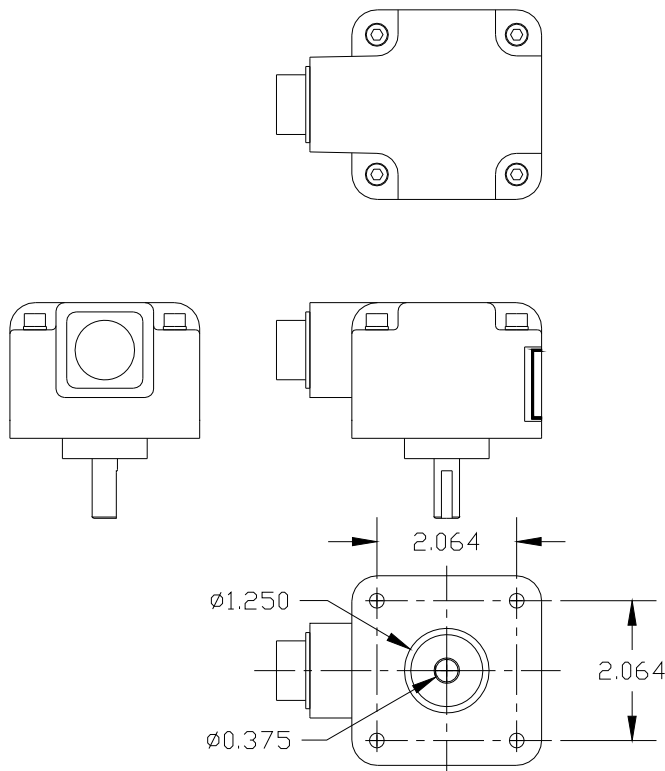
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>H</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>I</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.10 ENCODER - AM5KP188



P/N	DESCRIPTION	QTY	UNIT
AM5KP188	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

### Specifications

**1200 Pulses per revolution**

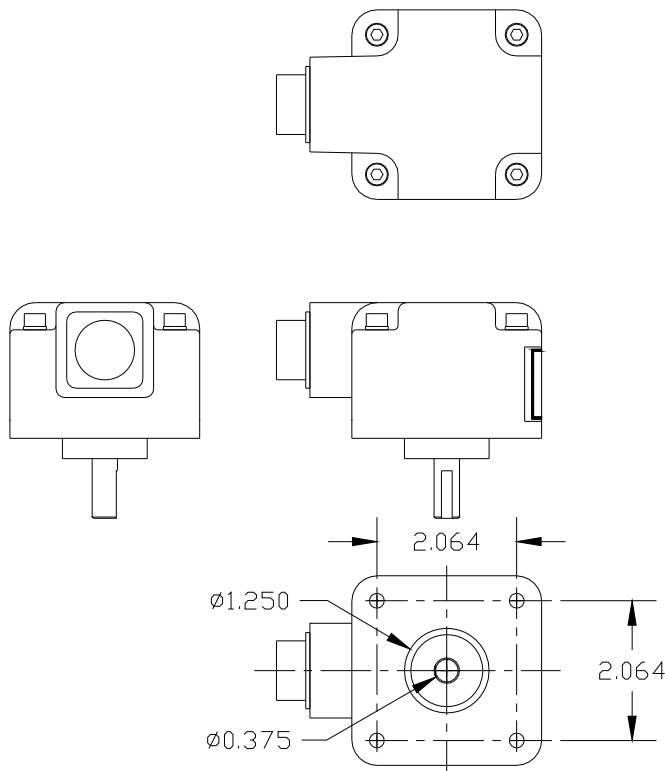
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.11 ENCODER - AM5KP189



P/N	DESCRIPTION	QTY	UNIT
AM5IP189	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

### Specifications

**1200 Pulses per revolution**

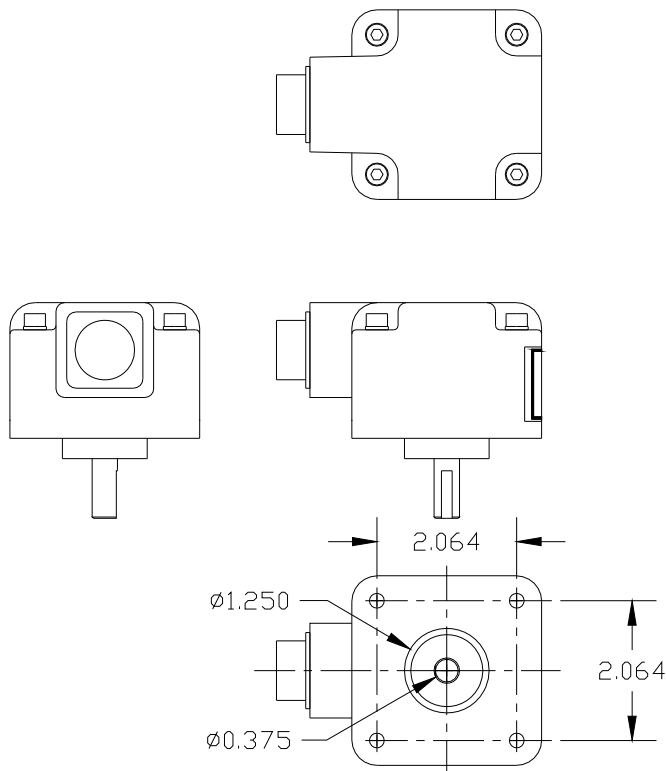
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

## 8.4.12 ENCODER - AM5KP192



P/N	DESCRIPTION	QTY	UNIT
AM5KP192	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

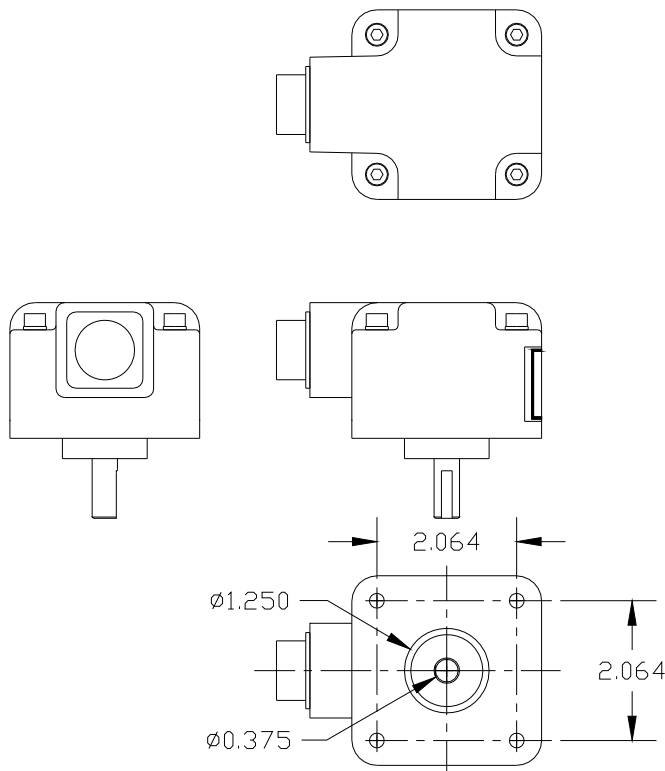
### Specifications

**1200 Pulses per revolution**  
**+5 to +15 vdc power**  
**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>C</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>E</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

### 8.4.13 ENCODER – AMS7P131



P/N	DESCRIPTION	QTY	UNIT
AM5KP131	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
ACMU2P09	DUST CAP MS25043-18DA	2	EA

### Specifications

**1200 Pulses per revolution**

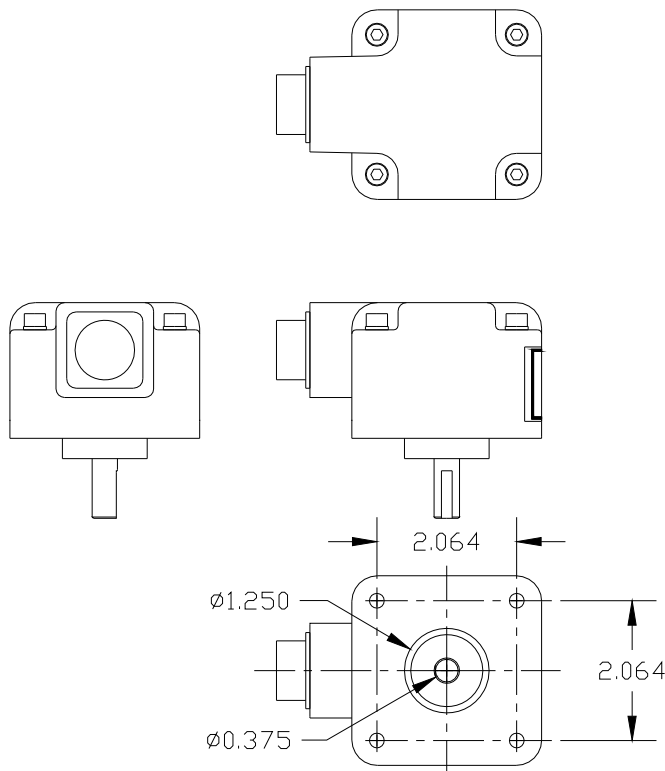
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>H</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>I</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

#### 8.4.14 ENCODER – AMS7P191



P/N	DESCRIPTION	QTY	UNIT
AM5KP191	ENCODER H25D-SS-1200-ABC-4469 ATEX EEx ia IIB T4	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-16DA	2	EA

#### Specifications

**1200 Pulses per revolution**

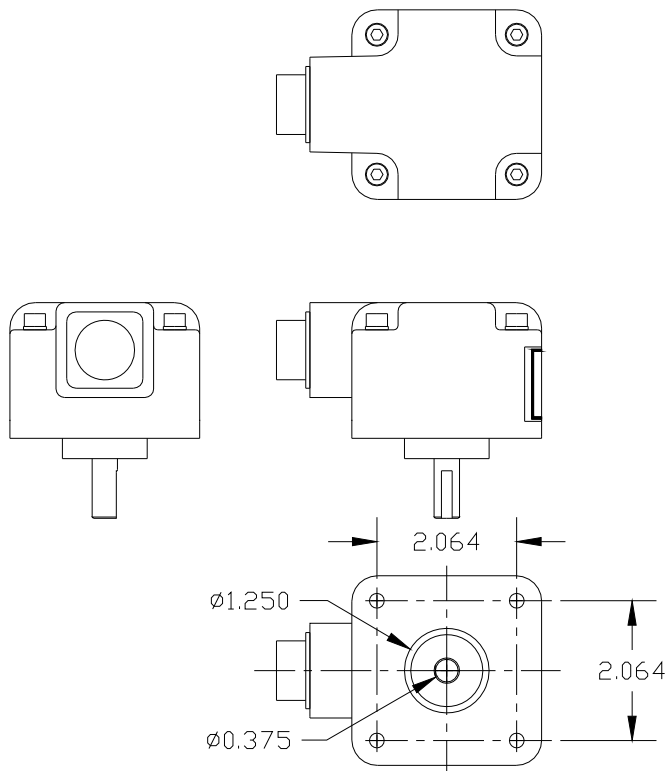
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

#### Pin Out

E	-	A
C	-	A\
G	-	B
D	-	B\
A	-	+5 to +15 vdc
B	-	Gnd
F	-	Case

## 8.4.15 ENCODER – AMSLP061



P/N	DESCRIPTION	QTY	UNIT
AM5KP061	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
ACMU2P09	DUST CAP MS25043-18DA	2	EA

### Specifications

**1200 Pulses per revolution**

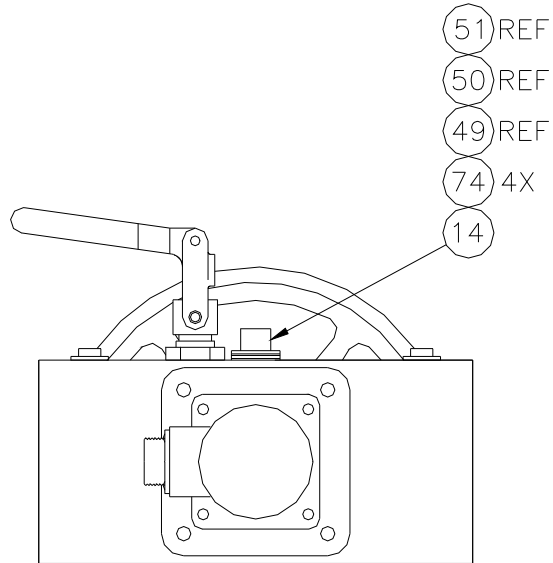
**+5 to +15 vdc power**

**Differential Quadrature output (A – A not, B – B not)**

### Pin Out

<b>A</b>	-	<b>A</b>
<b>H</b>	-	<b>A\</b>
<b>B</b>	-	<b>B</b>
<b>I</b>	-	<b>B\</b>
<b>D</b>	-	<b>+5 to +15 vdc</b>
<b>F</b>	-	<b>Gnd</b>
<b>G</b>	-	<b>Case</b>

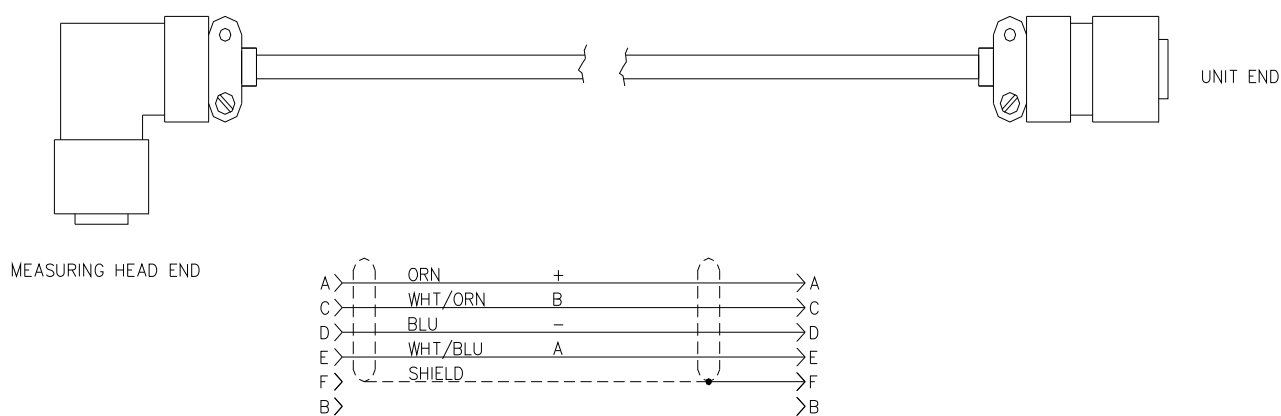
## 8.5 BACKUP ODOMETER - CABLE AND WIRING



ITEM	P/N	DESCRIPTION	QTY	UNIT
14	AM5KA058	ASSY ENCODER BACKUP MAGNETIC	1	EA
49	AM5KP027	CONN KPT02E10-6P RECEPTACLE MS3112	1	EA
50	AM5KP034	DUST CAP KPT8110C CANNON SHELL SIZE 10	1	EA
51	C276P041	O-RING 2-017	2	EA
74	AMS1P040	SCREW 6-32 X 3/8 PAN HD SST	4	EA

## 8.5 BACKUP ODOMETER continued

### AM5KA024-20 BACKUP ODOMETER CABLE 101343792



ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS7P062	CABLE 24/2P STNDED TC PE/PVC AL/MY SHLD W/DW NEC CMUL2919	20	FT
2	AM5KP057	CONN KPT06F10-6P STR PLUG	1	EA
3	AM5KP058	CONN KPT08F10-6S RT ANGLE PLUG	1	EA
4	AM5KP059	DUST CAP KPT8010C CANNON	2	EA
5	AM5KA034	BUSHING #9779-513-4 AMPHENOL	2	EA