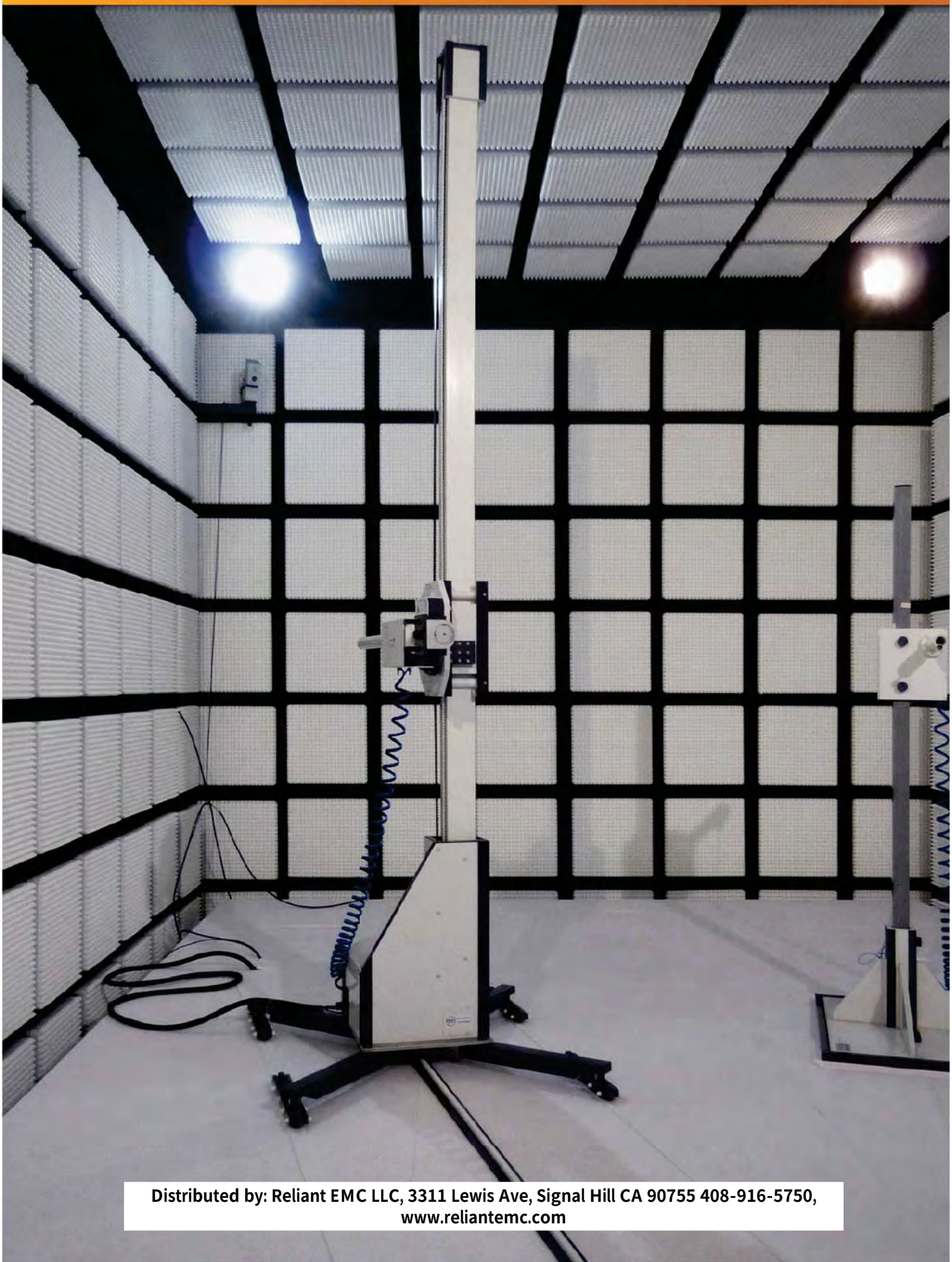


| 8 | POSITIONING SYSTEMS

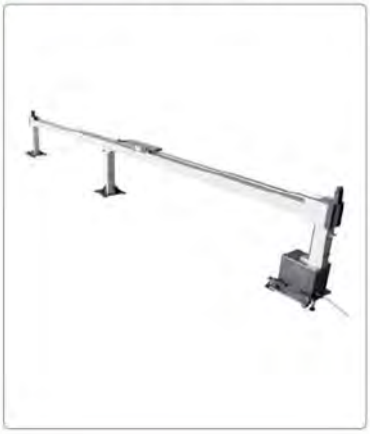
innco systems positioning systems are developed, designed and manufactured by our experienced and highly qualified engineering team, which enables a wide range of possibilities to design positioning systems according to your specifications or measurement applications.

The control of the system, singular or complex can be realized with our standard CO 3000 Controller, which allows connections to your measurement systems by GPIB or LAN.

| 8.1 | PRODUCT OVERVIEW

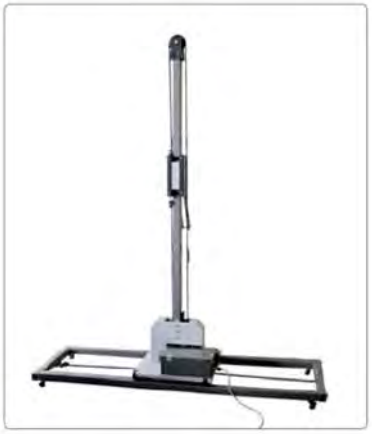
ABSORBING CLAMP POSITIONERS (KMS)

- Measuring length in: 5300, 5400, 6000 or 6100 mm
- Measuring height: 800 mm
- Slider unlockable and manually movable



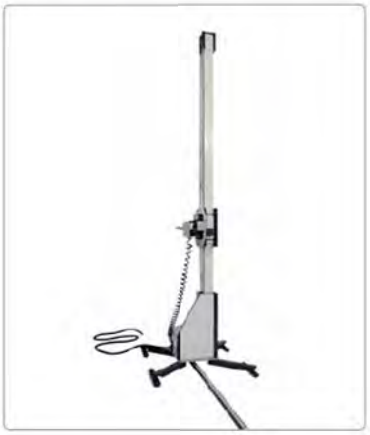
FIELD PROBE POSITIONERS (FSM)

- For 16 point measurement according to EN61000-4-3
- Max. load 2 kg



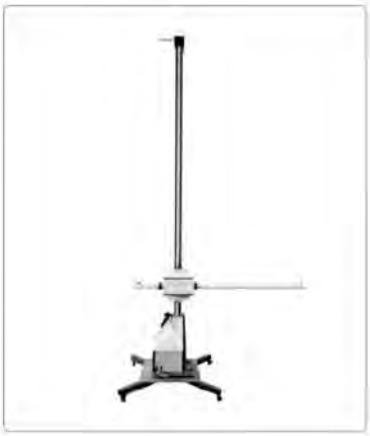
MAST POSITIONERS (MP)

- Movement range from 1500 to 10000 mm
- Movement of: antenna stand, antenna mast & twin mast



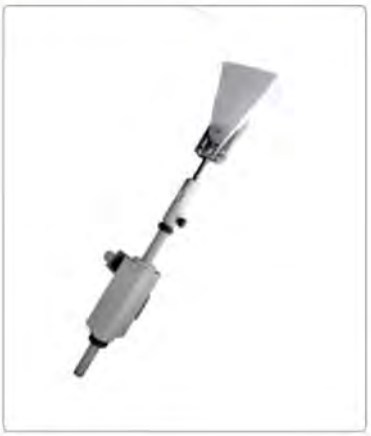
MAST ROTATORS (MR)

- For 125 kg and 250 kg mast weight
- In 200° and 400° turning range



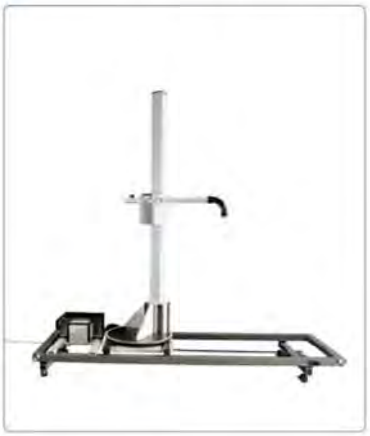
WALL POSITIONERS (WP)

- In electric or pneumatic polarisation
- Antenna weight up to 6 kg
- For measurement at fixed height



VSWR POSITIONERS

- Up to 15000 mm movement range
- Manual or automatic mast rotation
- Antenna weight max. 10 kg



| 8.2 | ABSORBING CLAMP POSITIONERS (KMS)

The KMS cable measuring slide bar construction is 100 % metal free, excepting the drive unit, which is located 430 mm from ground level. Used materials are mainly PVC & fiber glass reinforced plastic to keep high stability during frequently usage.

The universal clamp tray will fit for all commercially available measuring clamps. Limit switches and the general mechanical design ensure a reliable system operation.

New features are:

– Integrated roller & stopper for easy storage and setup

– Lockable clamp tray for manual movement of the slider

The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

SLIDE BARS (KMS)		
Type	Description	Article No.
KMS5300	Moving range 5300 mm, clamp trolley at 800 mm	80004994
KMS5400	Moving range 5400 mm, clamp trolley at 800 mm	80006713
KMS6000	Moving range 6000 mm, clamp trolley at 800 mm	80000351
KMS6100	Moving range 6100 mm, clamp trolley at 800 mm	80000350

ACCESSORIES	
Description	Article No.
Secondary tray for slide bar	80004713

SCOPE OF DELIVERY	
Type	Quantity
Interface to CO 3000	1 x
Power supply cable	1 x 5 m
Integrated roller & stopper for easy storage and setup	1 set
Un-lockable clamp trolley for manual movement of the slider	1 x
Fiber optic cable	1 x 5 m, 1 x 10 m
FSMA	2 x
Operating manual	1 x

TECHNICAL DATA			
TYPE	**KMS5300**	**KMS5400**	**KMS6000**
Measuring length	min. 5300 mm	min. 5400 mm	min. 6000 mm
Total length	max. 6400 mm	max. 6500 mm	max. 6900 mm
Height	800 mm		
Material	PVC + fiber glass, weatherproof		
KMS cross-section	100 x 100 mm		
Base L x W	300 x 300 mm, 3 supporting pillars		
Positioning speed adjustable between	min. 1 m / 35 sec, max. 1 m / 5 sec		
Positioning accuracy	± 5 mm		
Slide bar drive	1 toothed belt		
Motor	electronic EC motor 150 W		
Control	microcontroller		
Interface	CAN Bus via fiber optics		
Control cable	fiber optic (polymer type)		
Operating voltage	115 V / 230 V, 50 / 60Hz		
Current consumption	max. 1.6A		
Temperature range	+8 °C…+40 °C		
TYPE	**KMS6100**		
Measuring length	min. 6100 mm		
Total length	max. 7000 mm		
Height	800 mm		
Material	PVC + fiber glass, weatherproof		
KMS cross-section	100 x 100 mm		
Base L x W	300 x 300 mm, 3 supporting pillars		
Positioning speed adjustable between	min. 1 m / 35 sec, max. 1 m / 5 sec		
Positioning accuracy	± 5 mm		
Slide bar drive	1 toothed belt		
Motor	electronic EC motor 150 W		
Control	microcontroller		
Interface	CAN Bus via fiber optics		
Control cable	fiber optic (polymer type)		
Operating voltage	110 / 230 V (50 / 60 Hz)		
Current consumption	max. 1.6A		
Temperature range	+8 °C…+40 °C		

| 8.3 | FIELD PROBE POSITIONERS (FSM)

The Field Probe Positioner FSM 2315 is a two axis positioner for continuous or step by step movement according to EN61000-4-3 measurement. The movement range covers an area of 1.5 x 1.5 m.

Metal parts are used as less as possible and located in the drive unit only (max. 0.32 m above ground level). Limit switches and the general mechanical design ensure a reliable system operation.

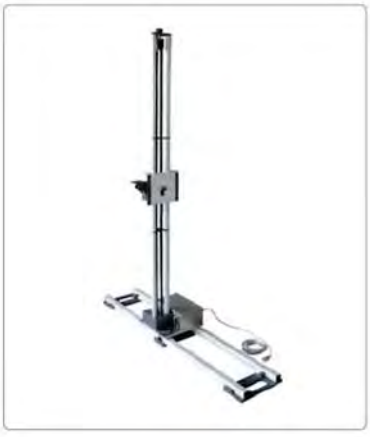
The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

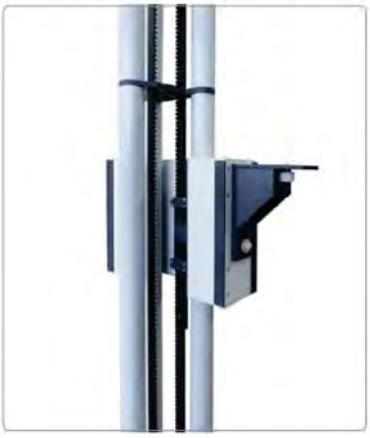
FIELD PROBE POSITIONERS (FSM)		
Type	Description	Article No.
FSM2315	Movement range 1500 x 1500 mm, max. load 2 kg	80000265
FSM2315-D	Movement range 1900 x 1500 mm, max. load 2 kg, dismountable for transport & storage	80002265

ACCESSORIES	
Description	Article No.
Transport case for storing / shipping	80005819
Manual movement for FSM 2315 (without drive unit)	80004929

SCOPE OF DELIVERY	
Type	Quantity
Interface to CO 3000 (FSM2315)	1 x
Interface to CO 3000 (FSM2315-D)	2 x
Power supply cable	1 x 5 m
Fiber optic cable (FSM2315)	1 x 5 m, 1 x 10 m
Fiber optic cable (FSM2315-D)	2 x 5 m, 2 x 10 m
FSMA (FSM2315)	2 x
FSMA (FSM2315-D)	4 x
Operating manual	1 x

TECHNICAL DATA		
TYPE	FSM2315	FSM2315-D
Sensor height (Z-axis)	800…2300 mm (adapter for other ranges available)	510…2410 mm
Horizontal movement (Y-axis)	1500 mm	
Total height	2650 mm	2500 mm
Probe fixing	1/4"-20 UNC	
Material	PVC, GFK, Kömacel®, POM	PVC, Kömacel®, fiber glass, polyamid
Overall dimensions	800 x 2240 mm	400 x 1933 mm
Sensor weight	max. 2 kg	
Position speed	max. 12 cm / sec	
Position accuracy	± 5 mm	
Movement of sensor	by toothed belts (Kevlar® cord reinforced)	
Motor	EC motor 150 W	
Control	microcontroller board	
Control line connection	fiber optic (polymer type)	
Drive unit	shielded and radio interference suppressed 20 dB under Class B	
Operating voltage	230 V 50 / 60 Hz (optional 110 V)	
Current consumption	max. 1.6 A	
Temperature range	+8 °C…+40 °C	





| 8.4 | MAST POSITIONERS (MP)

The mast positioners are designed to move antenna masts with weights up to 80 kg / 175 lbs. They can be used in many ways for:

– automatic and accurate positioning of antenna masts when using different antennas with different reference distances

– automatic movement to minimise the influence of not used antennas / masts when measuring is done with two antennas sequentially

– NSA and VSWR / site VSWR measuring procedure (in combination with antenna mast)

The device is easy to install. Metal parts are minimised and located only at the drive (height 250 mm) behind the antenna.

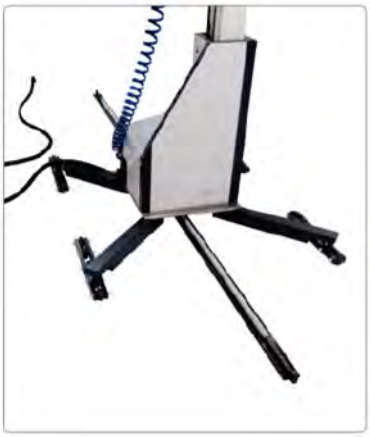
The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

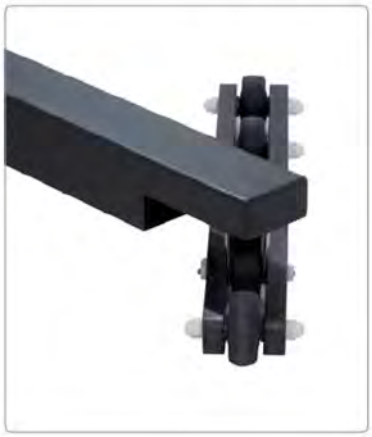
MAST POSITIONERS (MP)		
Type	Description	Article No.
MP2000	2000 mm movement range, max. load 80 kg	80002033
MP2500	2500 mm movement range, max. load 80 kg	80007017
MP3000	3000 mm movement range, max. load 80 kg	80007159

ACCESSORIES		
Type	Description	Article No.
-VSWR	VSWR upgrade kit for regular mast on mast positioner	80007076

SCOPE OF DELIVERY	
Type	Quantity
Interface to CO 3000	1 x
Power supply cable	1 x 5 m
Fiber optic cable	2 x 5 m, 1 x 10 m
FSMA	2 x
Operating manual	1 x

TECHNICAL DATA			
TYPE	MP2000	MP2500	MP3000
Horizontal movement range (electric)	2000 mm	2500 mm	3000 mm
Material	plastics (except the drive)		
Working length	2000 mm	2500 mm	3000 mm
Overall length	2420 mm	2920 mm	3420 mm
Max. load	80 kg		
Positioning speed	approx. 5 cm / sec		
Positioning accuracy	± 1 mm		
Motor	electronic EC motor 150 W		
Control	microcontroller		
Control cable	fiber optic (polymer type)		
Drive unit	shielded and radio interference suppressed 20 dB under Class B of CISPR22		
Operating voltage	110 / 230 V (50 / 60 Hz)		
Temperature range	+8 °C...+40 °C		





| 8.5 | MAST ROTATOR (MR)

The mast rotator MR0125 is designed to turn the antenna masts with weights up to 250 kg.

The MR0125 can be used in many ways for:

– automatic and accurate positioning of antenna masts when using different antennas with different reference distances

– automatic movement to minimise the influence of not used antennas / masts when measuring is done with two antennas sequentially

– save time for the operator & measurement. Antenna change is not necessary during frequency change.

The device is easy to install. Metal parts are minimised and located only at the drive (height 250 mm) behind each antenna.

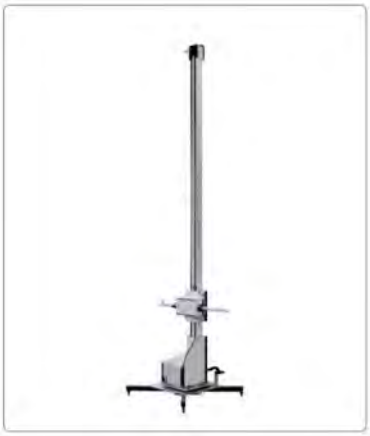
The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

MAST ROTATOR (MR)		
Type	Description	Article No.
MR0125	max. load 125 kg, 200° turning range	80005743
MR0250	max. load 250 kg, 200° turning range	80005745

ACCESSORIES	
Description	Article No.
400° turning range for MR0125	80005743
400° turning range for MR0250	80005744

SCOPE OF DELIVERY	
Type	Quantity
Interface to CO 3000	1 x
Power supply cable	1 x 5 m
Fiber optic cable	1 x 5 m, 1 x 10 m
FSMA	2 x
Operating manual	1 x

TECHNICAL DATA		
TYPE	MR0125	MR0250
Total height	standard mast height will not increase	
Max. load	125 kg	250 kg
Rotating angle	-10° to +190° (-20 ° to +380 ° on request)	
Positioning speed	0.26 to 1.3 rpm	
Positioning accuracy	± 0.5 °	
Motor	electronic EC motor 150 W	
Control	microcontroller	
Control cable	fiber optic (polymer type)	
Drive unit	shielded and radio interference suppressed 20 dB under Class B of CISPR22	
Operating voltage	110 / 230 V (50 / 60 Hz)	
Temperature range	+8 °C...+40 °C	



| 8.6 | WALL POSITIONERS (WP)

The WP positioners are specifically designed to be mounted on chamber wall for measurements in electromagnetic absorption chambers at a fixed measuring height & distance. The construction is completely free of metal (except the drive unit). The enclosed DC motor, controlled via a fiber optic cable, is used during polarisation. Adjustable limit switches at end position enable a security feature.

The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

WALL POSITIONERS (WP)		
Type	Description	Article No.
WP0500-EP	500 mm distance to the wall, 6 kg antenna weight	80007007
WP0600-EP	600 mm distance to the wall, 6 kg antenna weight	80007165

ACCESSORIES		
Type	Description	Article No.
-PP	Optional pneumatic polarisation	80004906
-MT	Optional manual tilt bore sight (only with –PP)	80000337

SCOPE OF DELIVERY	
Type	Quantity
Interface to CO 3000	1 x
Power supply cable	1 x 3 m
Fiber optic cable	1 x 5 m, 1 x 10 m
FSMA	2 x
Operating manual	1 x

TECHNICAL DATA		
TYPE	WP0500-EP	WP0600-EP
Antenna height fixed at	customer defined position	
Distance from antenna centre to the wall	500 mm	600 mm
Distance from positioning device to the wall	400 mm	500 mm
Material	PVC, Kömacel® & fiber glass, weatherproof	
Needed space on the wall H x W	550 mm x 500 mm	
Antenna weight	max. 6 kg (at the end of antenna pipe)	
Polarisation	0° / 90° (vert. / hor.)	
Polarisation time 0° / 90°	approx. 4 sec	
Polarisation drive	DC motor via gear drive	
Control	microcontroller board	
Control cable	fiber optic (polymer type)	
Total weight	17 kg	18 kg
Operating voltage	230 V 50 / 60Hz (optional 110 V)	
Current consumption	1.25 A	
Temperature range	+8 °C…+40 °C	

| 8.7 | VSWR POSITIONERS

The VSWR linear positioner is designed to support the automatisation of VSWR / and site VSWR measuring procedures with antennas up to 10 kg. The slide can be moved horizontally via innco systems standard controller OR if equipped with PC-option directly by PC. The signal is transmitted via fiber optic cable. An energy chain supports the antenna cable the whole measurement distance. The height of the antenna is manually adjustable. Most horn antennas can be polarised.

The mast beam can be rotated vertically excentric so the rotation axis is optimised according to the antenna center. The device is easy to move by lockable rollers. Metal parts are located only in the base plate and the drive mechanism (max. 0.4 m above ground level).

The GPIB (IEEE 488) & LAN (TCP/IP) bus, when operated with the CO 3000 Controller, provides an additional control option for all functions.

VSWR POSITIONERS

Type	Description	Article No.
VSWR1500-MP	Moving range 1500 mm, 3 kg load MP= Manual Polarisation	80004937
VSWR4000-MP	Moving range 4000 mm, 5 kg load	80006785
VSWR15000-MP	Moving range 15000 mm, 10 kg load	80005697

ACCESSORIES

Type	Description	Article No.
-MR	Mast section rotatable	80006813
-M	Manual positioning for VSWR (no drive unit)	80004938

SCOPE OF DELIVERY

Type	Quantity
Interface to CO 3000	1 x
Power supply cable	1 x 5 m
Fiber optic cable	1 x 15 m
Operating manual	1 x

TECHNICAL DATA			
TYPE	VSWR1500-MP	VSWR4000-MP	VSWR15000-MP
Horizontal movement range (electric)	1500 mm	4000 mm	15000 mm
Antenna height (manually adjustable)	800…2300 mm	800…2300 mm	800…2500 mm
Total mast height	max. 2200 mm	max. 2600 mm	max. 2800 mm
Polarisation	manually		
Numbers of segments	1 pc.	2 pcs.	7 pcs.
Size of segments	800 mm x 2860 mm	2750 m x 900 mm	2357 mm x 800 mm
Mast section rotatable	0…360° (manually)	0…360° (by drive)	–
Material	PVC + GFK, weatherproof		
Mast cross-section	60 mm x 60 mm	60 mm x 60 mm	100 mm x 100 mm
Base L x W	800 mm x 2860 mm	900 mm x 5500 mm	800 mm x 16500 mm
Antenna weight (extended load on request)	max. 3 kg	max. 5 kg	max. 10 kg
Positioning speed adjustable between	1 to 12 cm / sec (15 or 20 cm / sec available)		
Positioning accuracy	better ± 3 mm		
Driven by	toothed belt (Kevlar® cord reinforced)	rack track (metal free)	rack track (metal free)
Motor	electronic EC motor 150 W		
Control	microcontroller		
Control cable	fiber optic (polymer type)		
Drive unit	shielded and radio interference suppressed 20 dB under Class B of CISPR22		
Operating voltage	110 / 230 V (50 / 60Hz)		
Temperature range	+8 °C…+40 °C