

DOOR FRAME WELDING FOR WIND TOWERS

www.promotech.eu
www.windtowercutting.com

[®]
PROMOTECH

MCM - Promotech's portable 5-axis shape cutting, beveling and welding machine is designed for cutting and welding processes in door frame welding in wind towers industry.

MCM can be also used on flat, horizontal, vertical, convex, concave surfaces, pipes and tanks.

The MCM machine allows both sided oxy-fuel or plasma hole cutting, beveling and welding in one fixed position.

Optionally the MCM machine can be equipped with a welding equipment according to customers' preference.



MCM advantages:

- Capability to cut an opening which matches exactly the specific door frame which is going to be installed
- No CNC programming required
- Extremely accurate and consistent root gap, root face and bevel angle
- Simple and user friendly interface enables an easy input and configuration of cutting/beveling parameters. Innovative control system and software allows for double-sided beveling in one operation and ensures precise movement of cutting torch with active compensation of torch position with regards to work piece curvature
- Cutting/beveling/welding on flat, concave, convex and conical surfaces is also available
- Machine is fully portable
- Uses multi language, user friendly control system interface
- Custom made versions are also available
- Welding equipment from different manufacturers can be integrated with the MCM system
- Welding process is performed in an semi automatic cycle with possibility of manual adjustment of the welding gun

ABOUT US

For the last 25 years Promotech has been an export oriented company.

Over 90% of our production found its customers overseas.

Our main markets are: European Union, USA, Australia, Russia, Asia and the Middle East.

Promotech's product line can be divided into 3 categories: Magnetic Drilling, Beveling and Welding & Cutting Automation.

MAGNETIC DRILLING



BEVELLING



WELDING & CUTTING AUTOMATION



Recent developments include:

- New generation of Magnetic Drilling Machines and Bevellers
- Programmable Pipe Profile cutting Machine type PPCM
- Portable CNC Doorframe Cutting and Welding Machine type MCM
- Gantry Welding Systems
- Column & Booms
- Range of portable Welding and Cutting Programmable Carriages



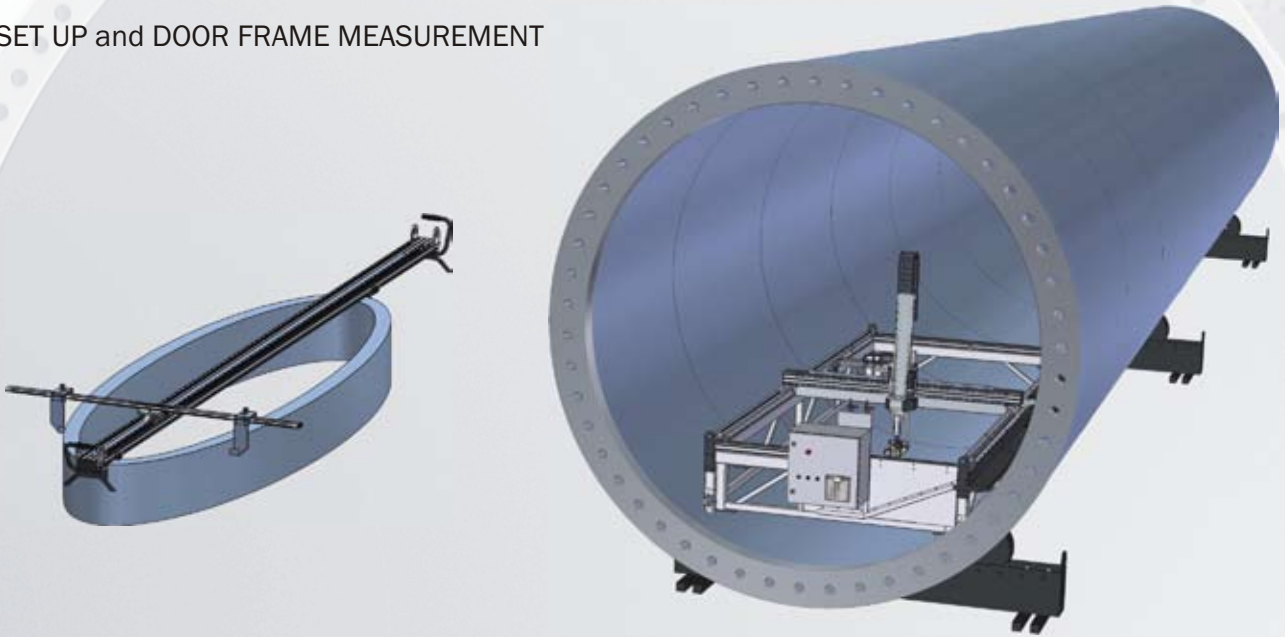
To learn more about PROMOTECH and our products please feel free to visit our website at www.promotech.eu and www.windtowercutting.com



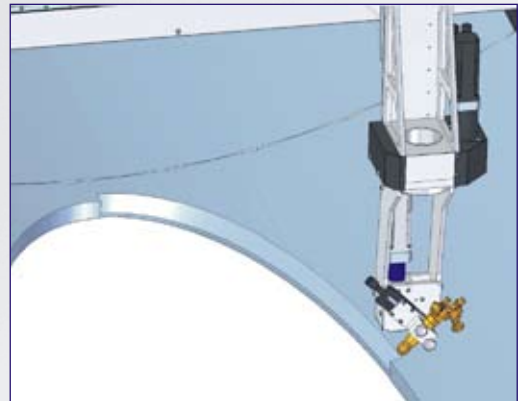
DOOR FRAME WELDING FOR WIND TOWERS

Full “door frame” process in 3 steps:

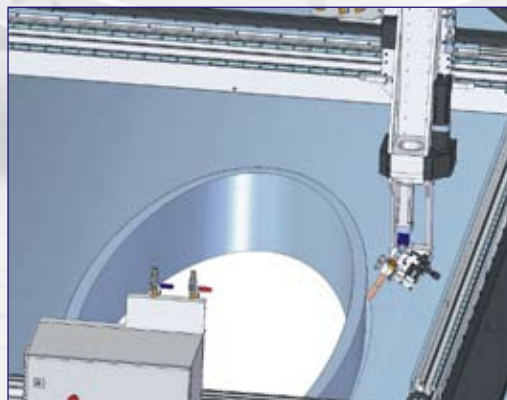
1. SET UP and DOOR FRAME MEASUREMENT



2. CUTTING & BEVELLING



3. DOOR FRAME WELDING

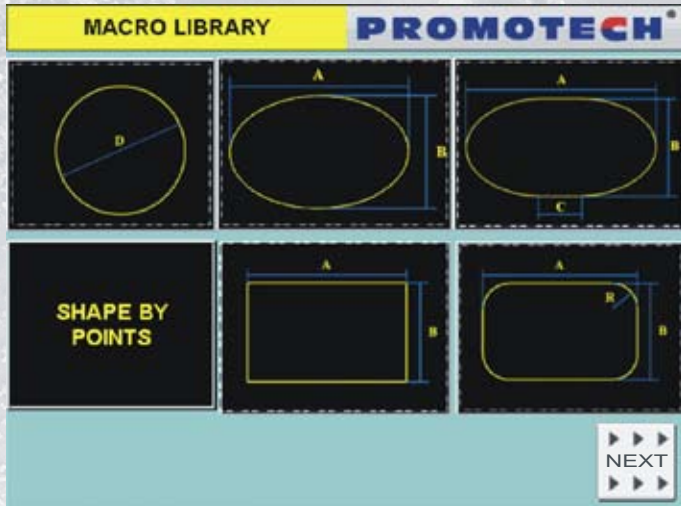


CONTROL SYSTEM

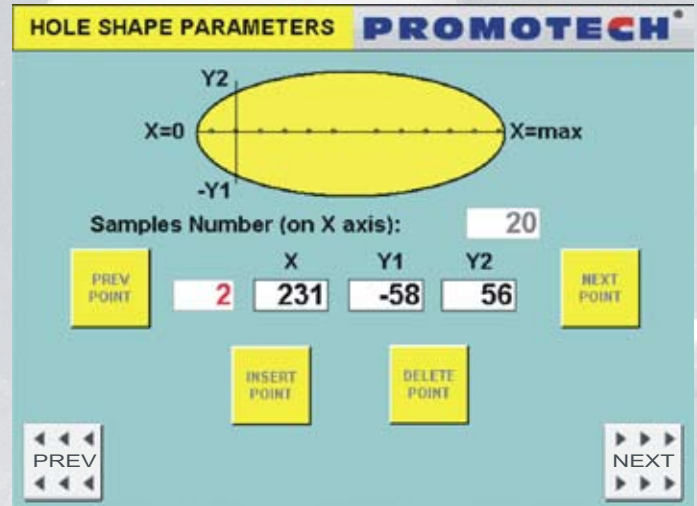
Unique control system makes shape programming very efficient and does not require any costly additional CAD/CAM software.

MCM is equipped with top quality servo motors to ensure high accuracy of positioning and reliability in hard environment.

MCM control system stores a library of basic geometrical figures such as rectangle, circle, ellipse and rectilinear ellipse and other similar shapes defined by users.



Screen picture no. 1



Screen picture no. 2

Programming process begins after door frame measurement and selection of required shape from systems library.

Next the operator inputs specific dimensions related to the job at hand. (Screen pictures no. 1, 2)

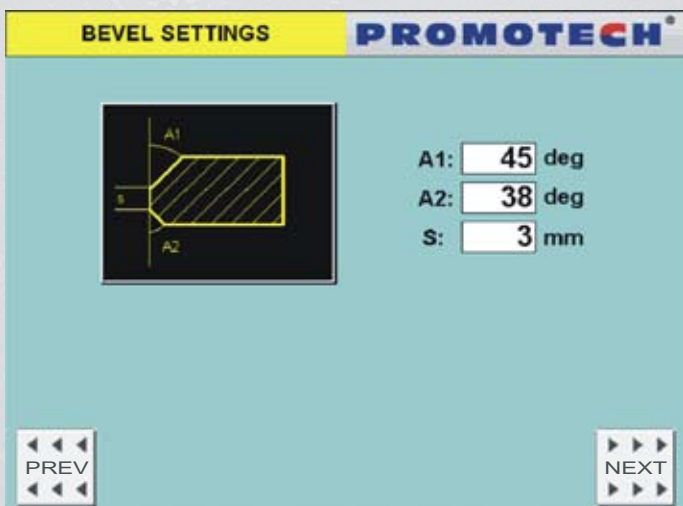
The shape preview is generated by the software (Screen picture no. 3).

Then the operator chooses basic parameters of cutting and determines beveling type. (Screen pictures no. 4, 5)

Once all the necessary data is entered, cutting & beveling process can be performed in one fully automatic cycle.



Screen picture no. 3



Screen picture no. 4



Screen picture no. 5

User friendly software allows full process monitoring. Cycle re-start with torch return back to the interrupted point is another important user friendly feature.

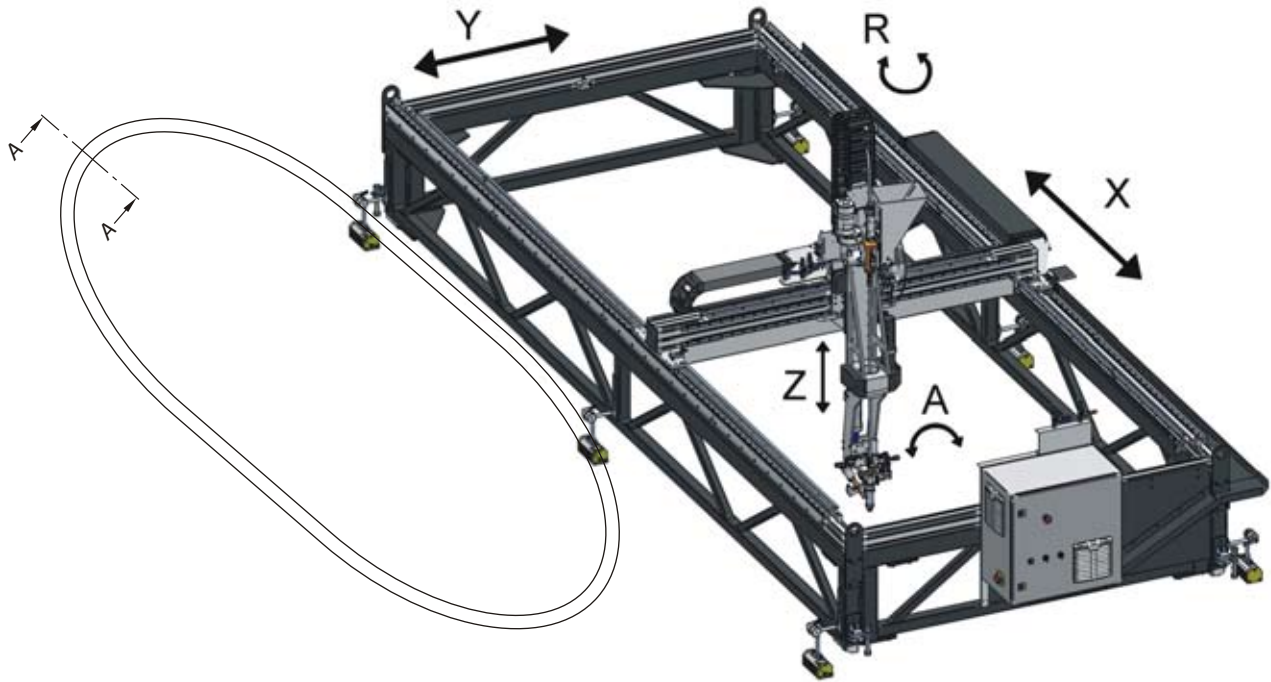
Arc Start & Stop and Wire Up & Down are optionally available on the handheld pendant.

PROCESS PARAMETERS		PROMOTECH®	
Cutting Speed	1000	mm/min	
Kerf Width	2	mm	
Torch Stand Out	10	mm	
Plate Thickness	50	mm	
Tool Length	123	mm	
Gap	1	mm	
Welding Speed	1000	mm/min	
Overlap	20	mm	
Start Crater Fill	5	sec	
End Crater Fill	5	sec	

◀◀◀ PREV
NEXT ▶▶▶

CUTTING PROCESS		PROMOTECH®	
Set Feed 500.0 inch/min	Program Name door frame 1	1155.70 X	
CUTTING Reference Point X = 1155.70 Z = -314.67 SET Reference Point	Function STRAIGHT CUT TOP BEVEL BOTTOM BEVEL	-2000.00 Y	
GO TO WELDING PAGE	Start From REFERENCE POINT SAVED POINT	0.00 Z	
CNC Status 0		272.14 R	
		0.00 A	
		Move Axis Y To The Zero Point	
		Move Axis R To The Zero Point	

WELDING PROCESS		PROMOTECH®	
Set Feed 1500.0 inch/min	Program Name door frame 1	1155.70 X	
CUTTING Reference Point X = 1155.70 Z = 314.67	Arc Start Mode MANUAL AUTO	-1234.00 Y	
WELDING Reference Point X = 1155.70 Z = 314.67 SET reference point	Start From REFERENCE POINT SAVED POINT	-254.47 Z	
CNC Status 0	180 Degree Offset OFF Outside Welding OFF	272.14 R	
	WIRE ↓ ↑	105.74 A	
	ARC CONTROL ⚠ ⚡	Move Axis Y To The Zero Point	
		Move Axis R To The Zero Point	

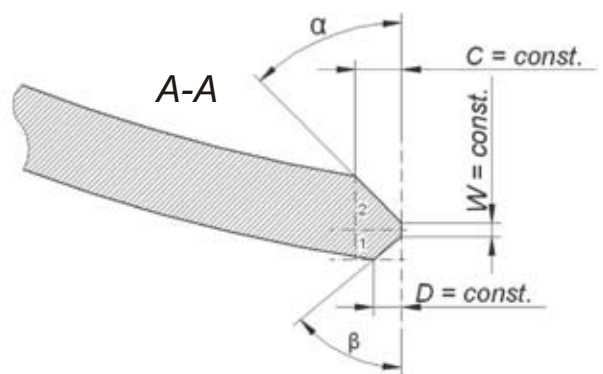


Thanks to the 5th axis MCM machine is able to operate with constant bevel width.
Accuracy of torch positioning is up to 0.1 degree.

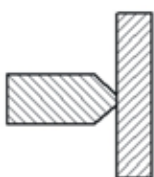
MCM's capability to maintain bevel width with automatic adjustment of beveling angle offers substantial opportunities to save costs through optimization of weld material deposition.

Hole dimensions when cutting at constant groove width:

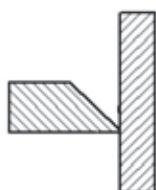
- α - Variable
- β - Variable
- C - Constant
- D - Constant
- W - Constant



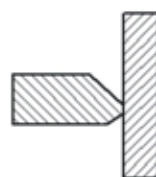
Typical beveling geometry:



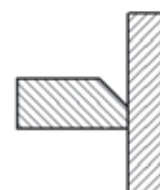
Double bevel



Single bevel



1/3 - 2/3 double bevel



Single bevel

The MCM machine offers new and unique feature. This new feature has been developed especially for the wind tower industry. A special tool and software named MSS allows to “teach” the machine an imperfect shape of an oval hole which needs to be cut, bevelled and welded. Door frames which are welded into wind towers usually have their individual oval shapes which are far different from each other. Thus a requirement for custom made shape each time a door frame needs to be welded into a wind tower.

MSS - measuring slide system consists of:

- measuring arm,
- slide,
- main beam with linear scale,
- software.

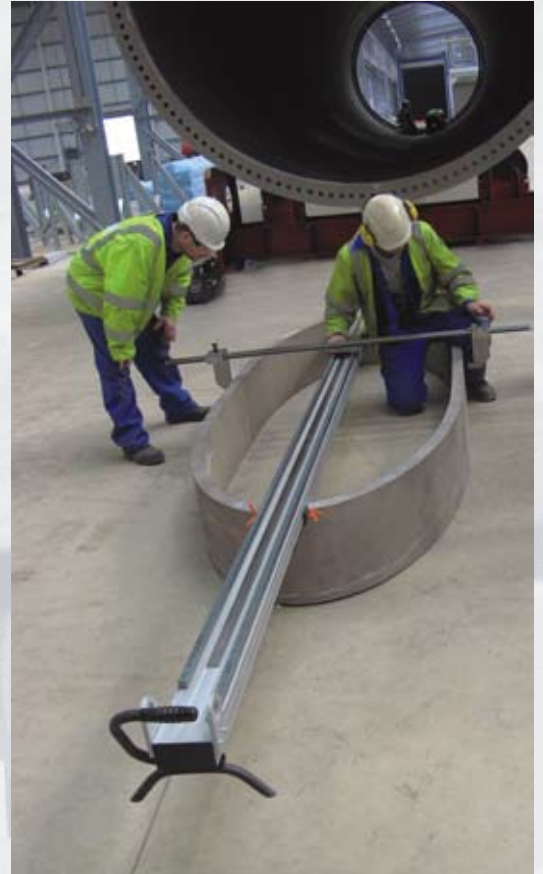
An operator places the aluminum beam with perpendicular measuring slide on the doorframe and makes width measurement at selected points (both left and right side of the frame).

Then the measured values are entered into to the machine’s control system. Next the MSS software calculates the exact cut-out shape and automatically generates torch path.

Entire operation takes up to 15 minutes.

Measuring of doorframe can be done independently and in advance, without MCM stand-by time.

It is cost effective, precise and quick way of doorframe shape programming.

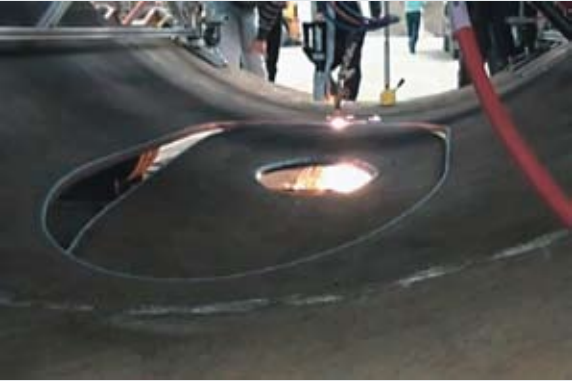


MSS system ensures each time perfect fitting of individually shaped door frames.



Recent applications photos

1. Cutting



2. Beveling



3. Double-sided beveling



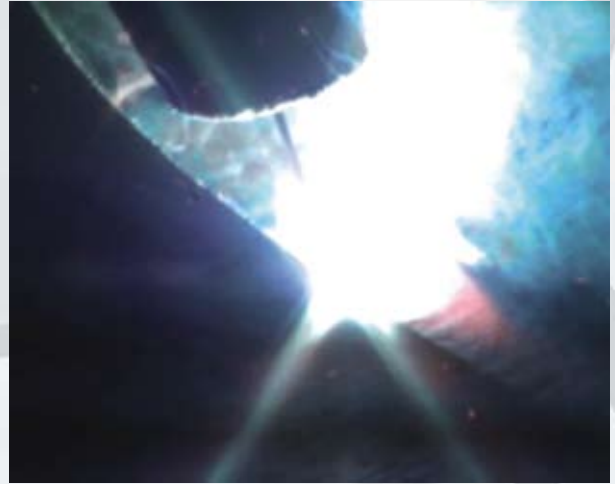
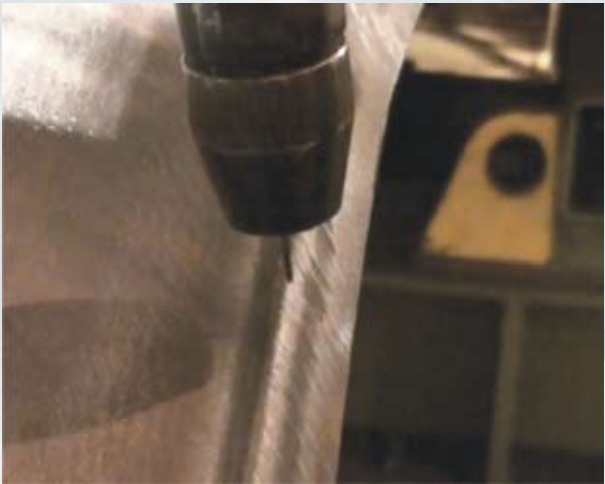
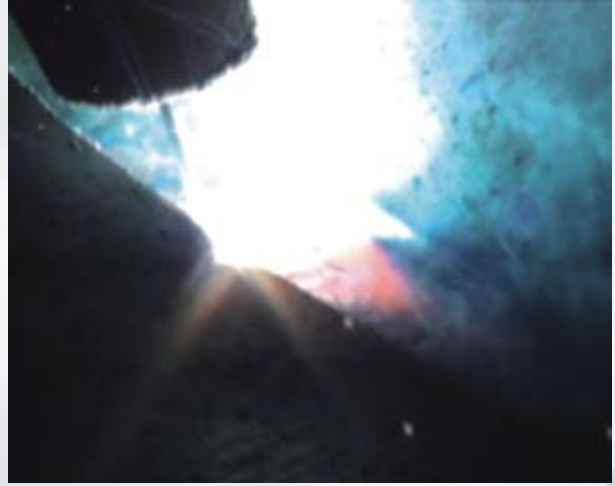
4. Door frame fitting



5. Welding SAW



6. Welding FCAW/MCAW with or w/o oscillation



BREAKTHROUGH IN DOOR-FRAME WELDING

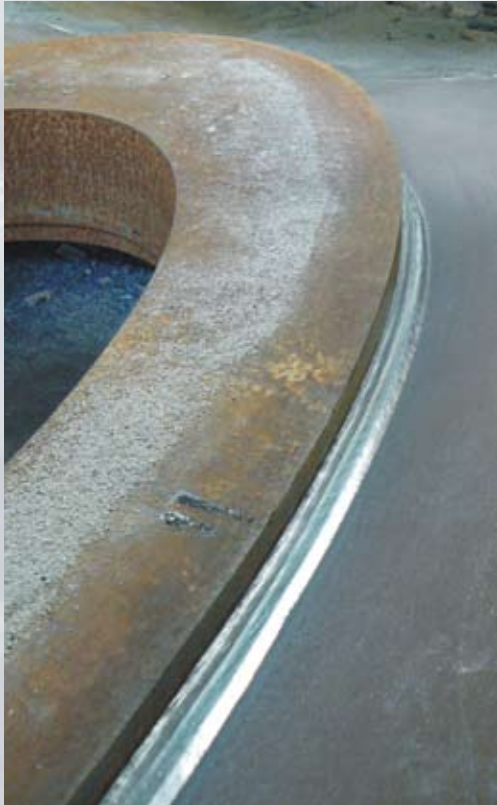


Manual process



Mechanized by the MCM

7. High quality welding results



Attention to details:



Heavy duty steel & aluminum frame with increased rigidity



6 top quality permanent magnets provide workholding system 6x 250kg which ensures firm, fast & easy machine job to job re-positioning.



Cutting & welding processes are controlled with the hand held control pendant with control cable protected against high temperature.



Quick action valve within hand's reach enables fast on/off switch of fuel gas supply to the torch



Roller balls make sliding inside can section much easier.



LED lighting is standard



Production and tests at Promotech.



Sea freight



Air freight



Assembly on-site after air freight

MCM on site



Machine type:	MCM-3200 S	MCM-4000 S	MCM-4000 W
Power supply	230V (+10%, -5%), 50/60Hz	230V (+10%, -5%), 50/60Hz	230V (+10%, -5%), 50/60Hz
Minimal pipe diameter	3000 mm, also suitable for flat surfaces	3000 mm, also suitable for flat surfaces	3500 mm, also suitable for flat surfaces
Maximum door frame length	3200 mm	4000 mm	4000 mm
Maximum door frame width after beveling	1200 mm	1200 mm	1400 mm
Maximum beveling angle	45 degrees	45 degrees	45 degrees
Maximum travel speed	2,0 m/min	2,0 m/min	2,0 m/min
Weight (w/o welding equipment)	630 kg	720 kg	750 kg
Overall machine dimensions			
Length	4685 mm	5730 mm	5730 mm
Width	2280 mm	2630 mm	2880 mm
Height	1800 mm	1800 mm	1800 mm
Number of controlled axes	5 axes	5 axes	5 axes
Oxy -fuel cutting/beveling (acetylene recommended)	yes	yes	yes
Transport frame	yes	yes	yes
Hand held control pendant	yes	yes	yes
Welding SAW, FCAW, MCAW	Option	Option	Option

Customized versions available on request

MCM CONFIGURATION:

MCM system can be integrated with various welding systems such as different power sources, welding controllers, welding heads, control cables, flux feeding systems or flux recovery systems.

MCM system enables full process control from handheld control pendant.

NO CNC PROGRAMMING REQUIRED



Standard position:

- horizontal



inside tubes or vessels
with ID min. 3000mm

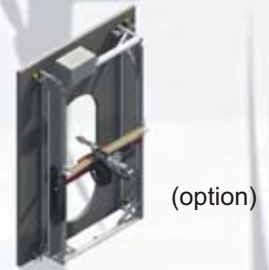
- on flat surfaces (plates etc.)

Typical “out of position” applications:

- external
- or vertical



externally on tubes or tanks
with OD min. 3000mm



MCM DOOR FRAME WELDING IN WIND TOWERS

FEATURES AND BENEFITS:

- No CNC programming skills required
- Cutting and beveling made each time to an individual, unique oval shape of door frame
- Very high quality, automatic welding (either SAW or FCAW/MCAW)
- User friendly control system
- System already proven with several European and US tower manufacturers for a number of years
- Perfect repeatability
- Unmatched efficiency



Consider challenges of robotized SAW or GMAW technologies against MCM technology.

Just think that MCM system does not require:

- mechanical or optical seam tracking which stand for higher investment cost (without tracking any robot is blind)
- top quality welding preps are no longer required as MCM makes them fully automatically just before welding
- highly skilled operator to run a robot
- MCM does not require any programming skills from the operator

The latest MCM information is available at product website at www.windtowercutting.com



MCM Video Gallery is available at www.youtube.com/promotechbialystok/

