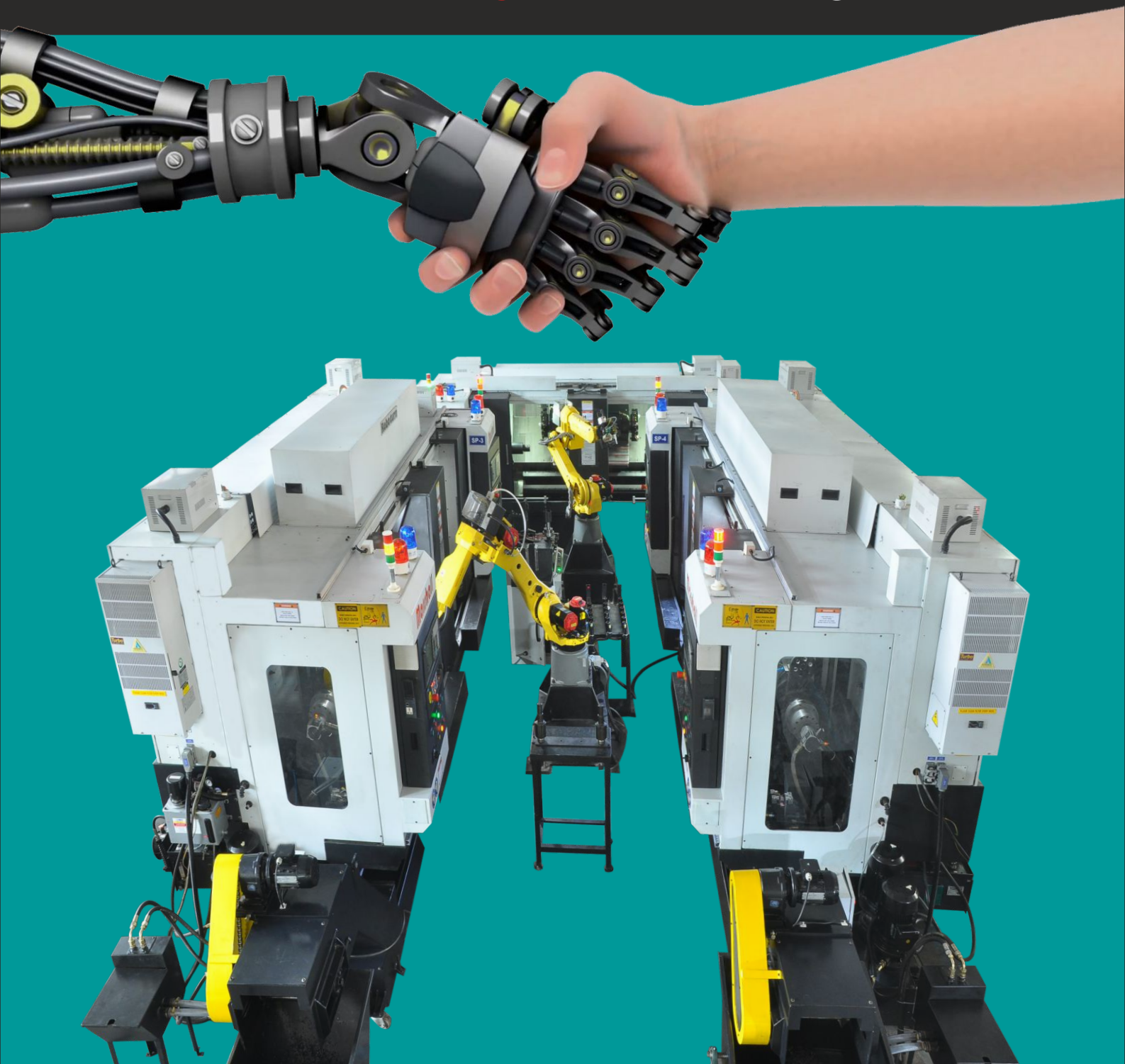




# Roboturn

'Smart' Automated Turning Solutions  
with **Industry 4.0** technologies

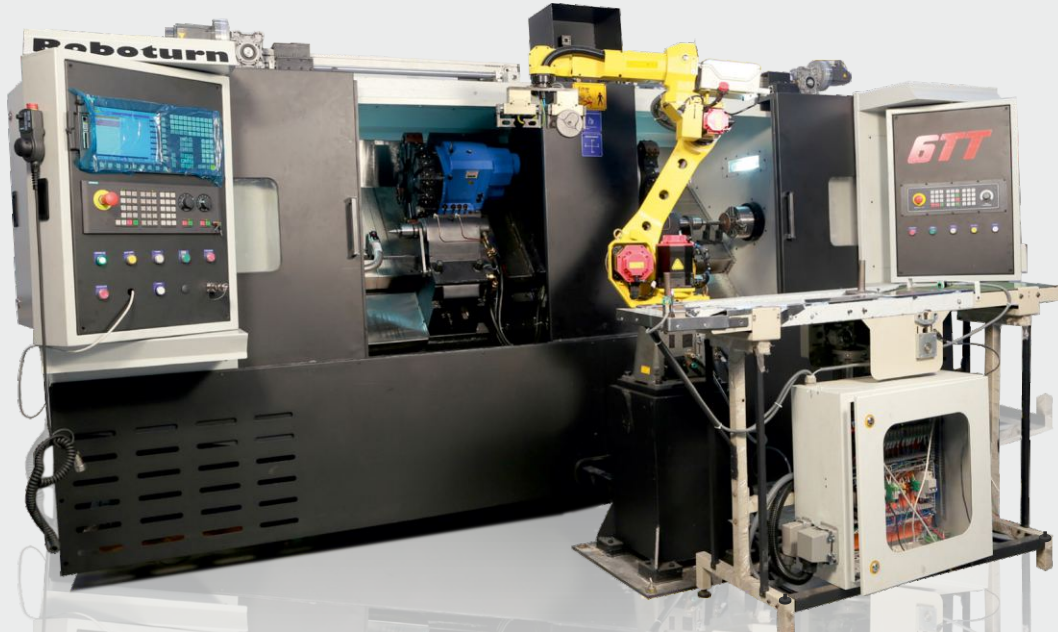


**TRANSFORMING Manufacturing... *Smartly!***

# Roboturn 'T-Series'

## Double Spindle machines with Double Turrets.

These are most suitable for medium and large sized jobs where cycle time per setup is greater than 30 seconds.



### SPECIFICATIONS

Model	TWINTURN-6TT	TWINTURN - 8TT	TWINTURN-12TT	TWINTURN XL
<b>CAPACITY</b>				
Swing Over Bed (mm)	400	450	520	750
Maximum Turning Dia. (mm)	250	320	360	500
Maximum Turning Length (mm)	150	150	150	150
with Tailstock	340	330	325	350
<b>MAIN SPINDLE</b>				
Spindle Nose (Standard)	A2-5	A2-6	A2-8	A2-11
Front Bearing Bore (mm)	85	100	110	150
Maximum Bar Capacity (Std.) (mm)	38	45	55	75
(Optional.) (mm)	42	52	64	90
<b>SPINDLE DRIVE</b>				
Spindle Motor Power (KW) Fanuc	7.5/11	7.5/11	15/18.5	22/30
Spindle Motor Power (KW) Siemens	9/12	9/12	16/21	26.5/30
Inf. Variable speed range (rpm)	100-4000	100-3500	50-2800	30-1800
<b>RAPID TRAVERSE</b>				
STANDARD				
X-axis (m/min.)	24	24	20	20
Z-axis (m/min.)	24	24	20	20
TOOL TURRET				
No. of Stations (Std.)	8	8	8	12
Tool Cross Section	25x25	25x25	25x25 / 32x32	32x32
Max. Boring Bar Dia.	40	40	40 / 50	50
<b>POSITIONING REPEATABILITY</b>				
X-axis	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns
Z-axis	± 2 Microns	± 2 Microns	± 2 Microns	± 2 Microns
CNC Controls: SIEMENS 828D (SL) / FANUC 0iTF				
Weight (approx.) (Kg)	6500	7000	9000	14000

Note - Product improvement is a continuous process at "Marshall". Design & Specifications are therefore, subject to change, without prior notice.

# Roboturn **VERSA**



**Most Versatile automated twin spindle turning center in the world.**

- Twin Spindles for completing job (OP 10 + OP 20) on the machine.
- Roof mounted 6 Axis Robot with 7th Linear Axis for covering wide area.
- Multiple functions of Robot: Tending to two spindles, cleaning station, Measurement Station & Laser marking station (for traceability)

## Integrated with Cleaning Station

**SmartCorrect®**

Gauging Station



**Laser Marking**

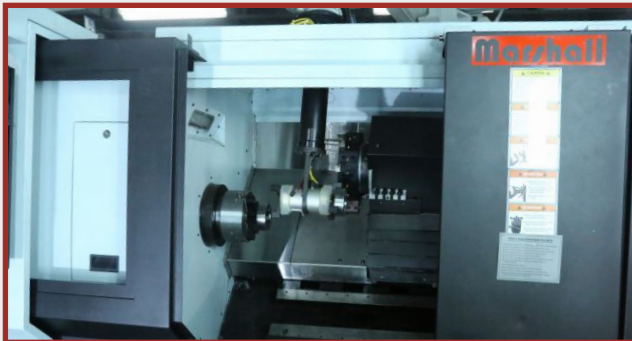
for job traceability



**To Check Video Solution**

**CLICK HERE**





Robot loading through Roof



Job cleaning station



Inspection & Auto Correction  
with **SmartCorrect**

Robot can load/unload  
4 turning Spindles, Clean, Inspect  
and also Load on other Machines  
for subsequent operation.

**To Check Video Solution**

**CLICK HERE**



# Roboturn machines preloaded with **THREE ESSENTIAL Industry 4.0 technologies**

## ESSENTIAL Industry 4.0 Technology #1

### for Productivity

#### Universal Machine Monitoring (**SmartFAC-Universal**)

- Actual Situation of the shop floor captured in Real Time.
- Eliminates duties of Supervisors to note hourly and daily production.
- No IT infrastructure required to use software. No physical wires on the Shopfloor.
- Secure Microsoft Cloud for data storage and can be accessed from anywhere in the world.
- All Plants data can be stored on the common cloud platform.
- Real Time alerts like SMS and Emails.



Single solution  
for all the machines



Seamless  
communication



Consistent  
quality



Effective capacity  
utilization



Lean and fast  
maintenance



OEE of  
each asset



Accurate costing  
of jobs



Avoiding  
Surprise Breakdowns

## SmartFAC-Universal



## ESSENTIAL Industry 4.0 Technology #2 for Machine Health

*SmartPredict* (Predictive Maintenance)

### PRINCIPLES:

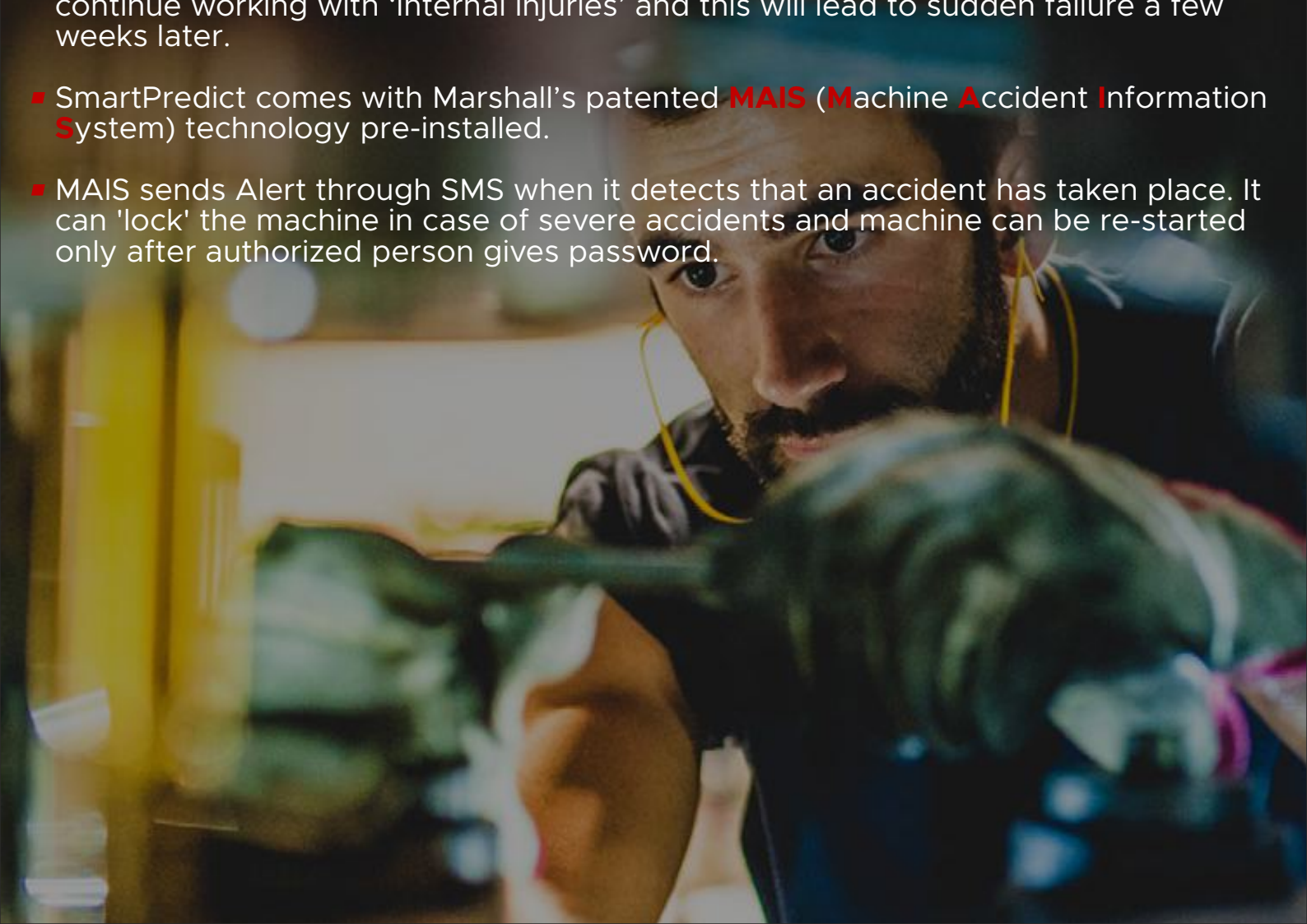
- Symptoms are used to detect potential problem
- Detection of symptoms is system based, & independent of human judgement
- Single or multiple symptoms (variables) may be used to detect problem with the help of rules or algorithms.
- Symptoms are detected with **IoT enabled SENSORS**

### *SmartPredict* Advantages

- Detection of 'Potential' problems ensures that corrective action takes place before the 'Potential Problem' causes breakdown.
- Huge saving in time and money

### Crash Detection & Predictive Maintenance Sensors.

- One of the biggest fears of machine shop owners & managers is that Operator will make an error and cause accident and then not inform his seniors. The machine will continue working with 'Internal Injuries' and this will lead to sudden failure a few weeks later.
- SmartPredict comes with Marshall's patented **MAIS** (**M**achine **A**ccident **I**nformation **S**ystem) technology pre-installed.
- MAIS sends Alert through SMS when it detects that an accident has taken place. It can 'lock' the machine in case of severe accidents and machine can be re-started only after authorized person gives password.



# ESSENTIAL Industry 4.0 Technology #3 for Quality

**CLAP** (Closed Loop Auto-corrected Production)  
ELIMINATES THE 3 HUMAN ERRORS

## The Problem : errors by operators

Machine Shops are dependent on Skilled Operators & Inspectors to ensure Quality of manufactured Jobs.



**Error #1  
Measurement**

Error due to non calibration  
or carelessness



**Error #2  
Judgement**

Which dimension to correct  
& how much?

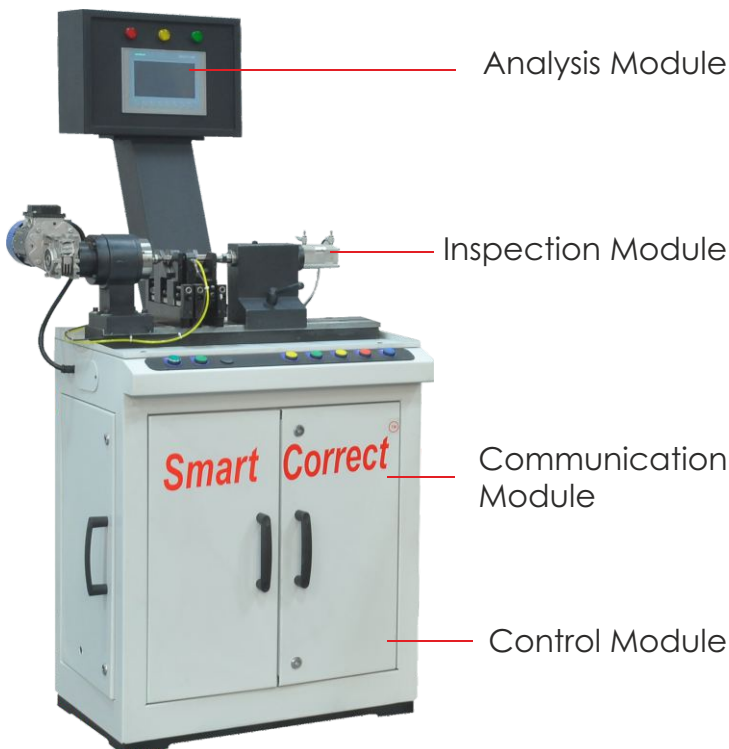


**Error #3  
Input**

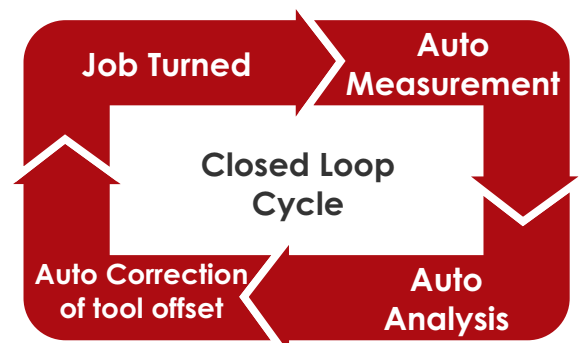
e.g. 0.04 value given in  
place of 0.004

## Result: Defectives

## The Solution



**SmartCorrect<sup>®</sup>** Gaging  
Station for Autocorrection  
of machine offsets



# Roboturn Lines & Cells @ Work

## Roboturn Cell for Transmission Gear



Cell consists of 2 Nos. TWINTURN XL Turning Centres (4 Nos. Spindles) positioned back to back with a Robot on high Platform loading & unloading through the retractable roof. Job is inspected with 3 Nos. **SmartCorrect** Gauging Stations mounted on Machine roof.

To Check Video Solution

[CLICK HERE](#)



## Roboturn VERSA



•Twin Spindles for completing job (OP 10 + OP 20) on the machine.

•Roof mounted 6 Axis Robot with 7th Linear Axis for covering wide area.

•Multiple functions of Robot: Tending to two spindles, cleaning station, Measurement Station & Laser marking station (for traceability)

To Check Video Solution

[CLICK HERE](#)



## Roboturn *FLEXI*cell



Robot changes Grippers in 2 seconds to perform flexible tasks  
**World's first Travelling Column Turning Center (Patent Applied)**  
Excellent for Automated Cells with Rear Loading



To Check Video Solution

[CLICK HERE](#)





## Roboturn Cell for Flywheel



Cell consists of 3 Nos. SL-30 Heavy Duty Turning Centres (A2-11 Spindles and 500 mm Turning Diameter) and 3 Nos. Drill Tap Centres. Robot is mounted on Linear Track (7th Axis) and Inspection after turning is done by Radio Frequency Touch Probes in Turrets.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Cell for Spindle



Cell consists of two SPM Spindles (Chamfering & Facing), Two OD Turning & Two Boring Spindles. Robot is mounted on a Linear Track (7th Axis) with Rapid Traverse upto 100 m/min. Cell has two **SmartCorrect** Gauging Stations for OD & Bore measurement & auto-correction.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Lines for Piston Insert



The line consists of 6 Nos. Spindles (3 Nos. Twinturn), a conveyor running end to end, 2 Nos. Robots & 2 Nos. **SmartCorrect** Gauging Stations. Input material is CI Tubes and finish Turned & inspected Piston Inserts leave the line.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Line For Tulip



Line consists of TWO Cells operated by two Robots. First Cell with 4 Spindles for OP 10 and second Cell with two Spindles for OP 20. Each Cell has a **SmartCorrect** Gauging Station.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Line for Motorcycle Crankshaft.



Line consists of TWO Cells operated by one Robots. First Cell with 4 Spindles for OP 10 and second Cell with two Spindles for OP 20. Each Cell has a **SmartCorrect** Gauging Station.

To Check Video Solution

[CLICK HERE](#)



## Flexible Automated cell for Gear Blank.



Cell consists of 3 Nos. Spindles (1 No. Twinturn 8TT and 1 No. Fortius) with Twinturn doing OP 10 on both Spindle & OP 20 on Fortius machine. Infeed is through Slatted Conveyor and jobs are inspected & sizes corrected with **SmartCorrect** Gauging Station.

To Check Video Solution

[CLICK HERE](#)



## Roboturn 6T Cell for Piston Pin



6 Nos. Spindles (3 Nos. TWINTURN) are tended by one Robot and 3 Nos. Bar Feeders. Infeed is Bars through Bar Feeders. After OP10, parted jobs are caught by SmartPartCatch (patent applied) and then loaded by Robot for OP 20. Inspection is by **SmartCorrect** Gauging Station.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Q6 for PRG (Piston Rod Guide)



Quattro is a 4 Spindle machine with two spindles doing first operation (OP10) and two spindles doing final operation (OP 20). Job is inspected and auto-corrections made by **SmartCorrect** Gauging Station.

To Check Video Solution

[CLICK HERE](#)



## Roboturn Cell for Pinion Shaft



Cell consists of 4 Nos. Spindles (2 Nos. Twinturn 8TT) with each Twinturn doing OP10 on one Spindle & OP 20 on second spindle. Infeed is through Slatted Conveyor and jobs are inspected & sizes corrected with **SmartCorrect** Gauging Station

To Check Video Solution

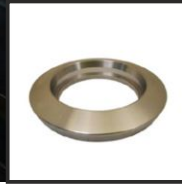
[CLICK HERE](#)



## Roboturn 8T Cell for Round Flange



Cell consists of 4 Nos. Spindles (2 Nos. TWINTURN 8T). An innovative feature is Camera based inspection of input material to ensure that unclean forgings (with excess flash) are not used.



To Check Video Solution

[CLICK HERE](#)



## Roboturn Cell for Companion Flange



Cell consists of 3 Nos. Spindles (One Twinturn 6T and one FORTIUS). Infeed is through Slatted Conveyor and job is inspected on 2 Nos. **SmartCorrect** Gauging Stations.



To Check Video Solution

[CLICK HERE](#)



## Roboturn DS-400 for Sprocket



Two Spindles (RAPIDTURN DS 450) are tended by one Robot. Infeed is vertical stacker. Two ROBOTURNS share one **SmartCorrect** Gauging Station.



To Check Video Solution

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# FACILITIES & WORKS

## MARSHALL INDUSTRY 4.0 CENTER

(75B, Sector 5, IMT Manesar, GURGAON) has been established for demonstrating the latest intelligent technologies meant for optimized, automated turning. Our goal is to assist Indian Industry in becoming a global power in manufacturing.



## MARSHALL AUTOMATION

(D-116-A, Phase V, Focal Point, Ludhiana) is the second unit of MARSHALL MACHINES LTD. and is India's first factory by a CNC machine builder dedicated to providing 'Intelligent Automation' solutions for CNC machines. It has a total of 40,000 sq. feet of space with fully air conditioned, dust proof Robot Integration & Test Area (R.I.T.A).



## MARSHALL MACHINES LIMITED

(C-86, Phase V, Focal Point, Ludhiana) is the Head Office and Mother plant. It has around 50,000 sq. feet of manufacturing facilities including most modern machining, assembly and test areas with state of the art equipment from best manufacturers in the world.



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**Marshall** Machines Ltd.



**Marshall** Automation America, Inc.

Smart CNC Automation & Gauging Solutions