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PRODUCTS & TECHNOLOGIES

September 2020

Marshall
TECHNOLOGY



TRISHOOL

YOUR WEAPON FOR
COMPETITIVENESS,
PROFITS
& PEACE OF MIND

SUPER-OPTIMIZED MACHINES

AFFORDABLE AUTOMATION

ESSENTIAL INDUSTRY 4.0 TECHNOLOGY



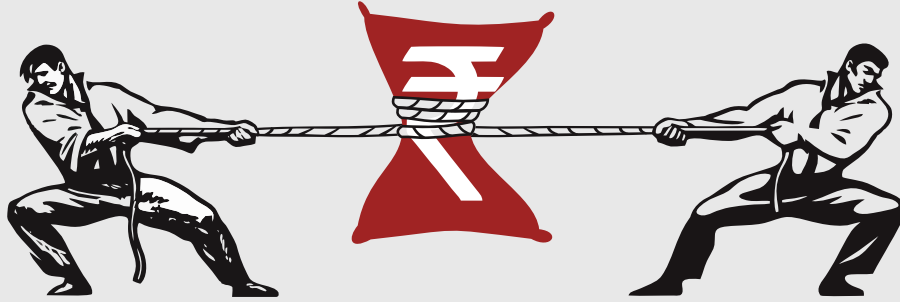
TRANSFORMING Manufacturing... *Smartly!*

WHY

Manufacturing needs
TRANSFORMATION
TODAY?

Problems of Manufacturing Sector

#1 PROFITS UNDER PRESSURE



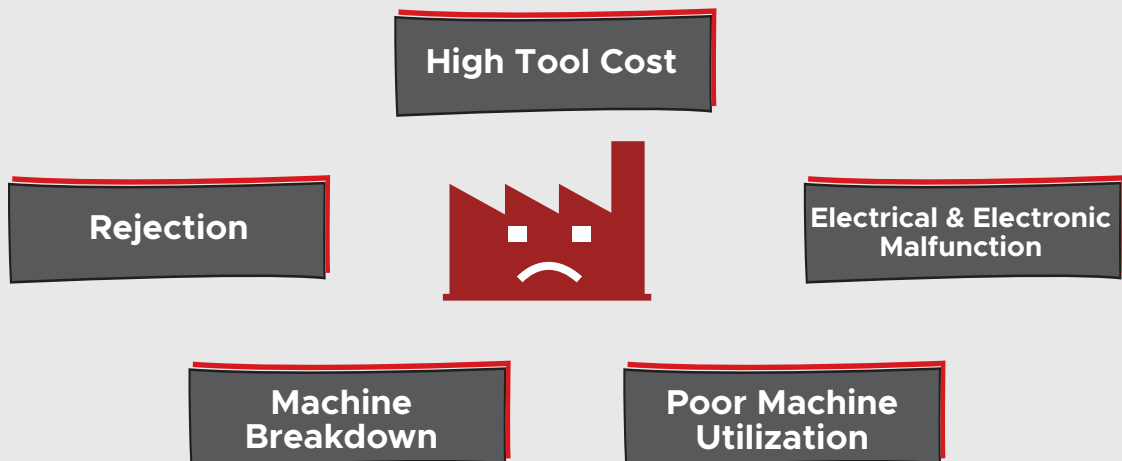
Demanding Customers

Aggressive Competitors

#2 SHORTAGE OF MACHINE OPERATORS



#3 Sub-Optimal Operation of Machine Shops



HOW

Marshall

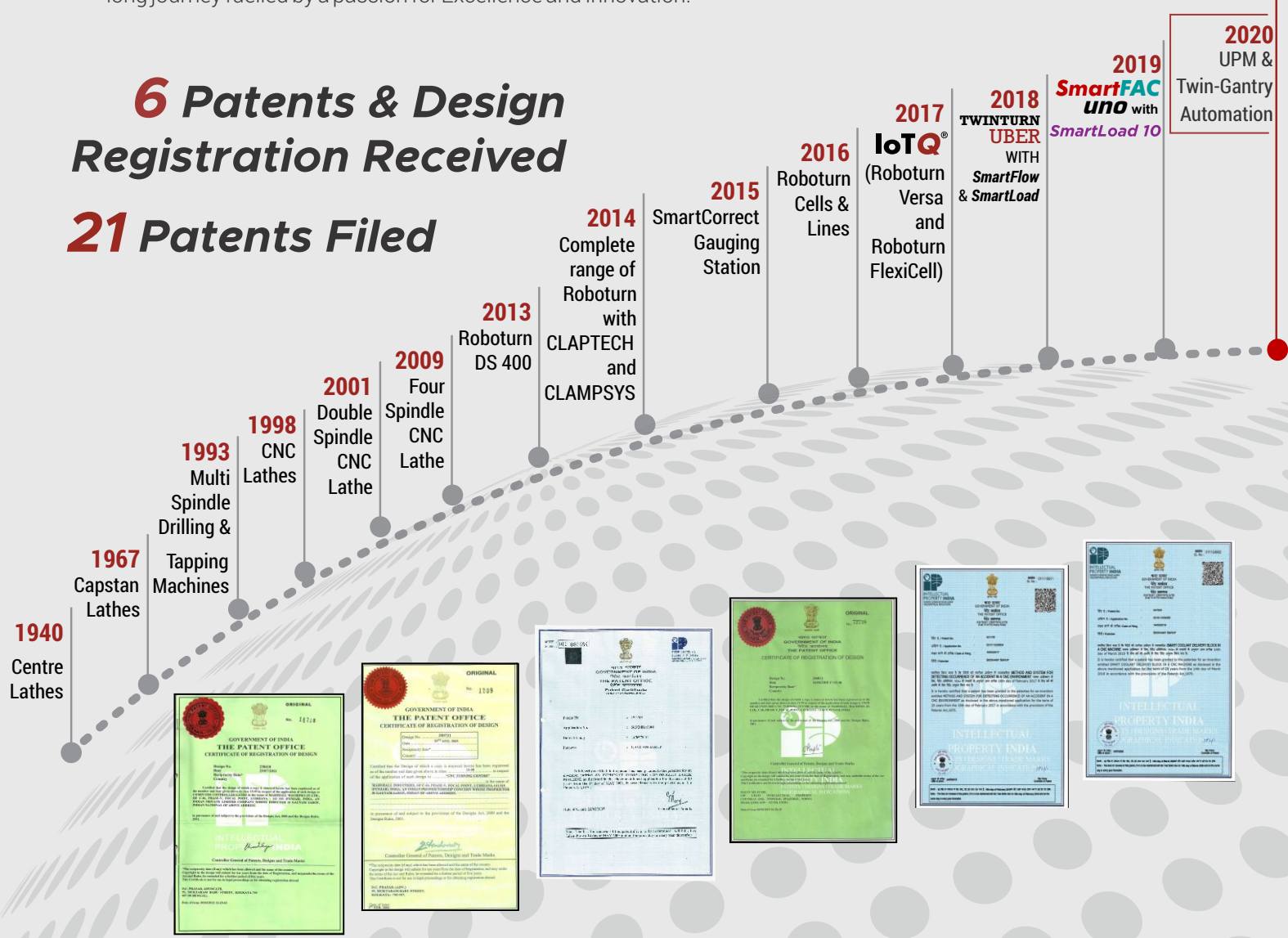
has DEVELOPED SOLUTIONS

80 YEARS OF INNOVATION

"MARSHALL MACHINES LTD, the most innovative machine tool manufacturer in India and the pioneer in 'Intelligent Automation' was started as Marshall Industries in 1961 by our visionary founder, Sh. Gautam Sarup. His father had built one of India's first lathes in 1940 in Lahore and instilled a love for machines in Sh. Gautam Sarup from a very young age.

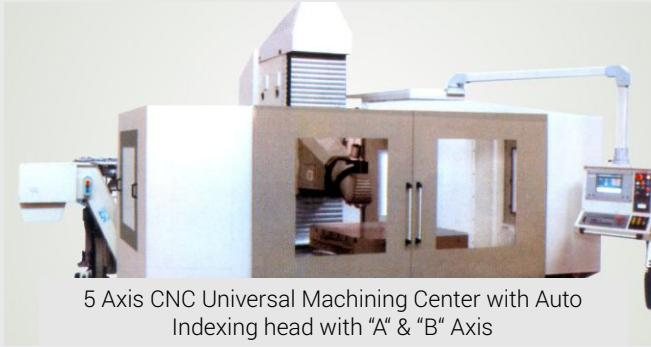
"He was joined by his two sons Gaurav Sarup (in 1986) and Prashant Sarup (in 1989). From Bench Lathes to Capstan Lathes to Multi Spindle Drilling/Tapping machines to CNC Lathes to Intelligent, Automated CNC Cells, it has been a long journey fuelled by a passion for Excellence and Innovation."

6 Patents & Design Registration Received
21 Patents Filed



INTENSIVE R&D = PATENTED TECHNOLOGIES

Our World class Infrastructure



5 Axis CNC Universal Machining Center with Auto Indexing head with "A" & "B" Axis



World's Best STUDER CNC Cylindrical Grinder



Double column universal machining center



World Class German Mother Machinery



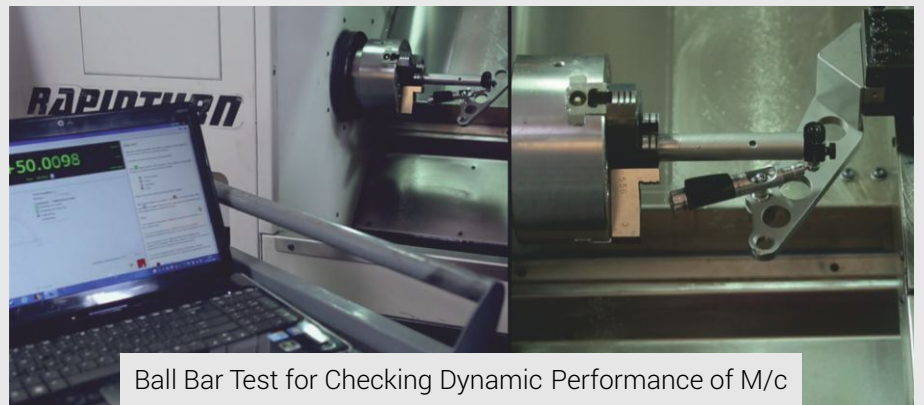
Inspection of Machine Parts



Latest Carl Zeiss CMM



Laser Calibration & Testing



Ball Bar Test for Checking Dynamic Performance of M/c

Temperature Controlled, Dust-proof Assembly Areas



Tech Center in Atlanta (USA)



Industry 4.0 Center in Manesar (Gurgaon)



WHAT are the SOLUTIONS

Marshall TECHNOLOGY

YOUR WEAPON FOR
COMPETITIVENESS,
PROFITS
& PEACE OF MIND



TRISHOOL

SUPER-OPTIMIZED MACHINES

AFFORDABLE AUTOMATION

ESSENTIAL INDUSTRY 4.0 TECHNOLOGY

1st Shool

SUPER-OPTIMIZED MACHINES

SINGLE SPINDLE MACHINES

CAF (CITIUS-ALTIUS-FORTIUS)	6
UNO	6
RIGIDTURN Series	8-9
TMH Series TURNMILLS	7

DOUBLE/TWIN SPINDLE MACHINES

RAPIDTURN Series	10-11
TWINTURN T Series	12
TWINTURN UBER	7

2nd Shool

AFFORDABLE AUTOMATION

UBER + SMARTLOAD 10-20	13
UNO + SMARTLOAD 10	13
ROBOTURN Series	14

3rd Shool

SMARTFAC :INDUSTRY 4.0 REIMAGINED !

SMARTFAC	15
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SUPER-OPTIMIZED MACHINES

CAF (CITIUS-ALTIUS-FORTIUS)



Inspired by the Olympic Motto: **Citius-Altius-Fortius** (Faster-Higher-Stronger) Marshall has studied the best compact turning centres in the world and created a TRIAD of class leading machines which raise the bar for performance in the three vital areas of SPEED, ACCURACY & RIGIDITY.

Please check the CAF catalogue for full details.

To Check Video Solution

[CLICK HERE](#)

UNO

The #1 Single Spindle Chucker



uno

#1

**RIGIDITY
SPEED
PRODUCTIVITY
TOOL LIFE**

- 60 Degree Slant Bed
- Monoblock Casting with 'Harcrete'
- 5500 RPM & 30m/min. Rapids
- Upto 8 tools per spindle with
- **SmartFlow** (Patented) Coolant System

Please check the *Uno* catalogue for full details.

To Check Video Solution

[CLICK HERE](#)

TMH

HEAVY DUTY TURNMILL SERIES

Our design, manufacturing processes & selection of finest machine elements from the best manufacturers in the world ensure the following;

- RIGIDITY of Bed & Base
- RIGIDITY of Head & Spindle Assembly
- RIGIDITY of Tailstock
- RIGIDITY of LM Guideways



This Attribute of RIGIDITY is present in even our smallest models because RIGIDITY is vital for:

PRODUCTIVITY ACCURACY
SURFACE FINISH
TOOL LIFE



Please check the TMH catalogue for full details.

To Check Video Solution

[CLICK HERE](#) 

TWINTURN UBER

Patent Applied

THE MOST IMPORTANT ADVANCEMENT IN

CNC TURNING IN INDIA

IN LAST 10 YEAR



THE MACHINE FOR

SUPER-OPTIMIZED TURNING

- 60 Degree Slant Bed
- Monoblock Casting with 'Harcrete'
- 5500 RPM & 30m/min. Rapids
- Upto 8 tools per spindle with
- SmartFlow (Patented) Coolant System

**TWINTURN
UBER**

Please check the TWINTURN UBER catalogue for full details. To Check Video Solution

[CLICK HERE](#) 

RIGIDTURN Series

Extra Heavy Duty CNC Turning Centre



With these 5 Advantages

To Check Video Solution

CLICK HERE



#1 HEAVY RATE OF METAL REMOVAL

#2 BETTER SURFACE FINISH & LONGER TOOL LIFE

#3 BETTER POSITIONING REPEATABILITY RESULTING IN CLOSE TOLERANCES ON JOB

#4 MUCH LONGER SERVICE LIFE WITH ORIGINAL ACCURACY

**#5 WIDESTRANGE OF MODELS AVAILABLE ALONG WITH CUSTOMIZED SOLUTIONS.
ALSO ALL RIGIDTURN MODELS AVAILABLE IN TURNMILL CENTRE VERSION**

Marshall Rigidturn slant bed heavy duty CNC turning centres offer highest value to our esteemed customers.

Our Machine Rigidity is best exemplified by our model RIGIDTURN SL-40-2500 with 650 mm turning Diameter, 2500 mm turning length and 3000 Kg max. job weight. (pls. see attached pictures).

This machine is being used to Hard Turn (O.D.) and soft turn (Ends) of Chilled Rolls with weight of 2500 Kg.

Our design, manufacturing processes & selection of inest machine elements from the best manufacturers in the world ensure the following:

- **RIGIDITY of Bed & Base**
- **RIGIDITY of Head & Spindle Assembly**
- **RIGIDITY of Tailstock**
- **RIGIDITY of LM Guideways**



This Attribute of RIGIDITY is present in even our smallest models because RIGIDITY is vital for:
Productivity | Accuracy | Surface inish | Tool Life

To Check Video Solution

[CLICK HERE](#) 

Specifications

Model	SL-20	SL-25	SL-30	SL-40	SL-50
CAPACITY					
Swing Over Bed (mm)	630	750	800	850	1000
Maximum Turning Dia. (mm)	350	400	500	650	800
Maximum Turning Length (mm)	500/700/ 1000/1500	700/1000/1500 /2000	700/1000/1500 /2000/2500/3000	700/1000/1500 /2000/2500/3000	700/1000/1500 /2000/3000
MAIN SPINDLE					
Spindle Nose (Standard)	A2-8	A2-8	A2-11	A2-15	A2-15
Front Bearing Bore (mm)	110	110	150	180	240
Maximum Bar Capacity (Std.) (mm)	55/64	55/64	75/90	90/110	160
SPINDLE DRIVE					
Spindle Motor rated power (KW) Fanuc	11/15	11/15	15/18.5	18.5/22 (or as req.)	22/26 (or as req.)
Siemens	12/16	12/16	16/21	22/30 (or as req.)	22/30 (or as req.)
Inf. Variable speed range (rpm)	50-3000	50-2800	50-2000	20-1200	20-1200
RAPID TRAVERSE					
STANDARD					
X-axis (m/min.)	24	20	20	20	15
Z-axis (m/min.)	24	20	20	20	15
TAILSTOCK					
Taper in Quill (mm)	MF5	MF5	MF6	MF6	MF6
Adjustable Thrust (Max.)	600	600	750	1000	1000
TOOL TURRET					
No. of Stations (Std.)	8	8	8/12	12	12
Tool Cross Section (mm)	25x25	32x32	32x32	32x32	32x32
Max. Boring Bar Dia.	40	50	50	50	50
POSITIONING REPEATABILITY					
X-axis	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 2 Microns	± 2 Microns
Z-axis	± 2 Microns	± 2 Microns	± 2 Microns	± 3 Microns	± 3 Microns
CNC Controls: SIEMENS / FANUC 0iTf					
Weight (approx.) (Kg)	6500/7500/ 8000/9000	8000/9000/ 10500/12500	8500/9500/ 11000/12500/ 13500/14500	8500/9500/ 11500/13000/ 14000/15500	9000/10000/ 11500/13500/ 14500/16000

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

RAPIDTURN Series

Double Head Single Slide CNC Turning Centre

Design Registered with Patent Office of INDIA



To Check Video Solution



Most Productive & Cost effective Turning Solutions for mass produced chucking jobs



Advantages

- NO IDLE TIME resulting in higher productivity
- WHILE MACHINING is going on at one head, the operator unloads completed job and clamps fresh job at the second head.
- TWO SET UPS available on one machine one half of a job can be completed on one spindle while the second half be completed on other spindle.
- ONLY ONE OPERATOR required & space taken is similar to one machine.
- LINEAR TOOLING SYSTEM used on "MARSHALL" DOUBLE SPINDLE MACHINES reduces machining time because of faster

*Productivity Comparison During Turning of Two Wheeler Gears Blanks

Single Spindle machine

	Machining Time	Loading/Unloading Time	Total Floor to Floor
1st Setup	20 sec	12 sec (Avg)	32 sec
2nd Setup	22 sec	12 sec (Avg.)	34 sec

Double Spindle machine

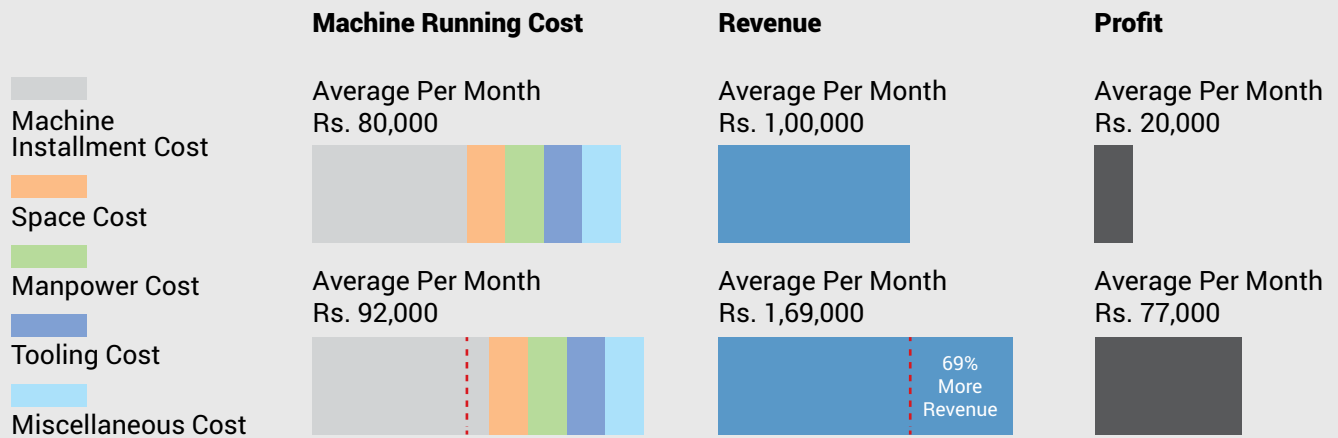
1st Setup Machining Time	Station to Station	2nd Setup Machining Time
18 sec	2 sec (Avg)	19 sec

Total Component Floor To Floor Time = 66 Sec

Total loor to loor time =39 sec

*Productivity Advantage =66/39=1.69. i.e. 69%

EXTRA PRODUCTIVITY = MUCH HIGHER PROFITS!



Specifications

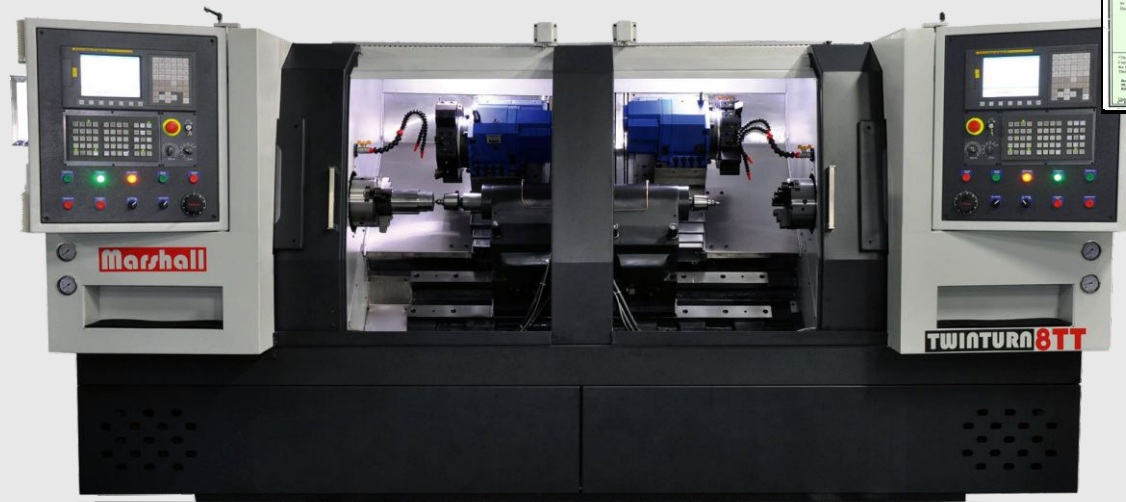
Model	SL-11(D)	SL-12(D)XF	DS 450	SL-14 (D)	SL-16 (D) XF
CAPACITY					
Swing Over Bed (mm)	310	350	400	450	450
Maximum Turning Dia. (mm)	135	210	250	260	350
Maximum Turning Length (mm)	100	125	125	150	200
Stroke (mm)	300	300	400	600	900
MAIN SPINDLE					
Spindle Nose (Standard)	A2-4	A2-5	A2-5/A2-6	A2-6	A2-8
Front Bearing Bore (mm)	80	85	85/100	100	110
Maximum Bar Capacity (Std.) (mm)	32	38	38-45	45	55
(Optional) (mm)	32	42	42-52	52	64
SPINDLE DRIVE					
Spindle Motor rated power (KW) Fanuc	5.5/7.5	7.5/11	7.5/11	7.5/11	11/15
Siemens		9/12	9/12	9/12	12/16
Inf. Variable speed range (rpm)	100-4500	100-4000	100-4000	100-3500	50-2800
RAPID TRAVERSE					
STANDARD					
X-axis (m/min.)	24	24	24	20	20
Z-axis (m/min.)	24	24	24	20	20
POSITIONING REPEATABILITY					
X-axis	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns
Z-axis	± 2 Microns	± 2 Microns	± 2 Microns	± 2 Microns	± 2 Microns
CNC Controls: SIEMENS / FANUC 0iTf					
Weight (approx.) (Kg)	4000	4500	5000	6000	7000

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

TWINTURN Series

Double Head Double Turret CNC Turning Centres

Design Registered with Patent Office of INDIA



The '2 in 1' Turning Centres designed to meet the REAL needs of Component Manufacturers:

- Saving in Space
- Saving in Manpower
- Saving in Shop Floor Material Movement

To Check Video Solution

[CLICK HERE](#) 

Specifications

Model	TWINTURN 6T (90)	TWINTURN 6TT	TWINTURN 8T/8TT	TWINTURN 12TT	TWINTURN XL
CAPACITY					
Swing Over Bed (mm)	400	400	450	520	750
Maximum Turning Dia. (mm)	250	250	320	360	500
Maximum Turning Length (mm) with Tailstock	150	340	140/330	325	350
MAIN SPINDLE					
Spindle Nose (Standard)	A2-5	A2-5	A2-6	A2-8	A2-11
Front Bearing Bore (mm)	85	85	100	110	150
Maximum Bar Capacity (Std.) (mm)	38	38	45	55	75
(Optional) (mm)	42	42	52	64	90
SPINDLE DRIVE					
Spindle Motor rated power (KW) Fanuc	7.5/11	7.5/11	7.5/11	11/15	15/18.5
Siemens	9/12	9/12	9/12	12/16	16/21
Inf. Variable speed range (rpm)	100-4000	100-4000	100-3200	50-2800	30-1800
RAPID TRAVERSE					
STANDARD					
X-axis (m/min.)	24	24	24	20	20
Z-axis (m/min.)	24	24	24	20	20
TOOL TURRET					
No. of Stations (Std.)	8	8	8	8	12
Tool Cross Section	25x25	25x25	25x25	25x25	32X32
Max. Boring Bar Dia.	40	40	40	40	50
POSITIONING REPEATABILITY					
X-axis	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 1.5 Microns	± 2 Microns
Z-axis	± 2 Microns	± 2 Microns	± 2 Microns	± 2 Microns	± 3 Microns
CNC Controls: SIEMENS / FANUC 0iTF					
Weight (approx.) (Kg)	6500	6800	7000	8000	11000

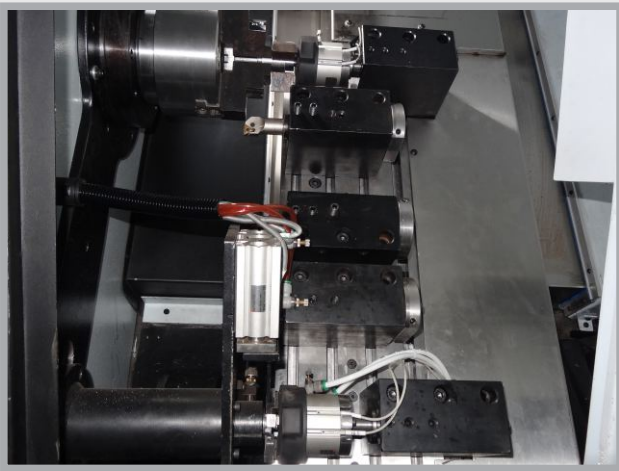
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2nd Shool

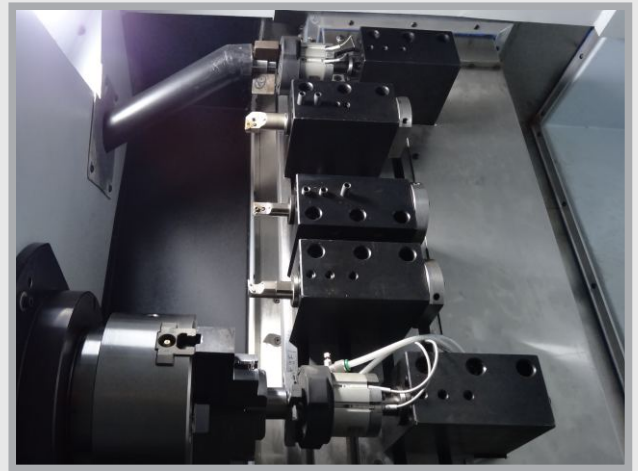
AFFORDABLE AUTOMATION

Patented *SmartLoad* based on “TWIN GRIP TWIN RELEASE”

TWIN GRIP



TWIN RELEASE



uno + *SmartLoad 10*



TWINTURN UBER + *SmartLoad 10-20*

FIVE Advantages of *SmartLoad* Technology

RELIABLE *Min. No. of Moving Parts*

COMPACT *Smallest Footprint*

SAFE *Mechanism inside machine. No risk to humans*

FAST *8-10 Sec. Load/unload time*

ECONOMICAL *50% the cost of Gantry or Robot based Automation.*

Please check the *uno* & TWINTURN UBER catalogue for full details.

WHAT are the Solutions available

SOLUTION #1 Bush Type Jobs



To Check Video Solution

CLICK HERE 

SOLUTION 2# Hex Nuts & Connectors



To Check Video Solution

CLICK HERE 

SOLUTION 3# Tube Type Jobs



To Check Video Solution

CLICK HERE 

SOLUTION #4 Long Shafts with Machining on ends



To Check Video Solution

CLICK HERE



SOLUTION #5 Seat Pipe & Small Tubular Components



To Check Video Solution

CLICK HERE



SOLUTION 6# Bearing Rollers, Brake Parts & Piston Pins



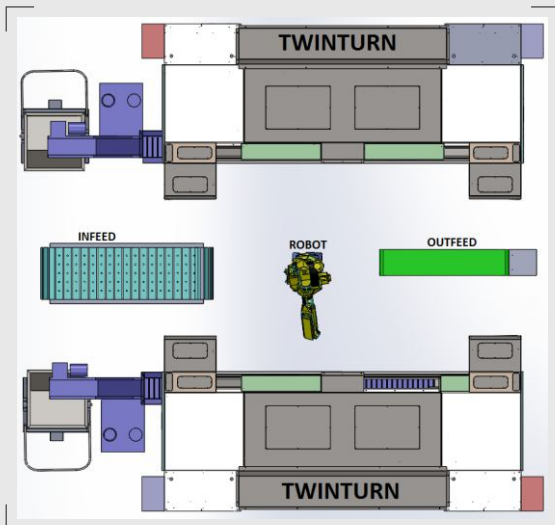
To Check Video Solution

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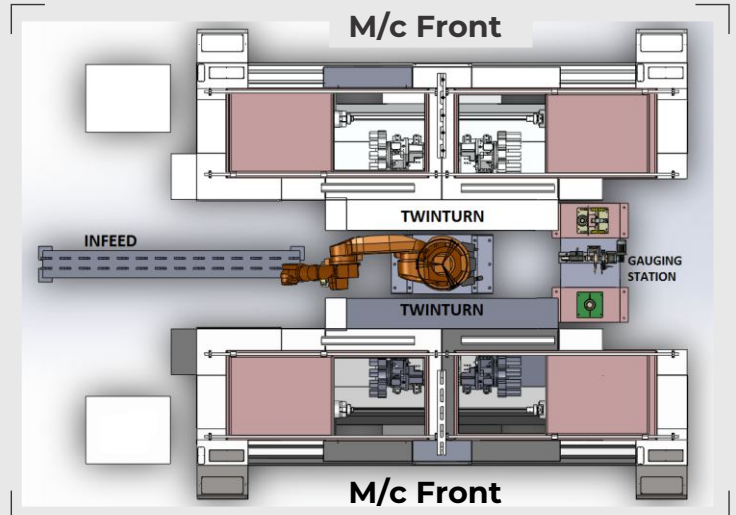


Roboturn Cells & Lines *Concepts*

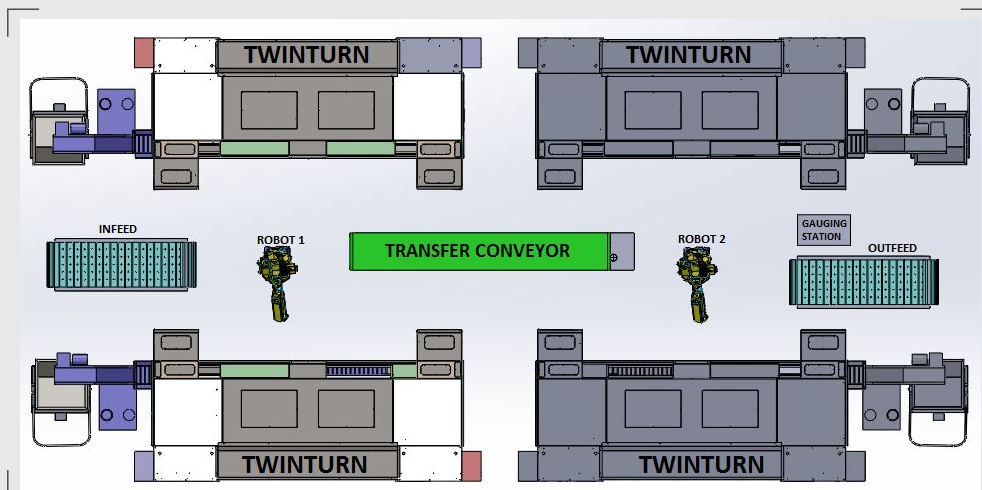
4 Spindle Cell (Front Loaded)



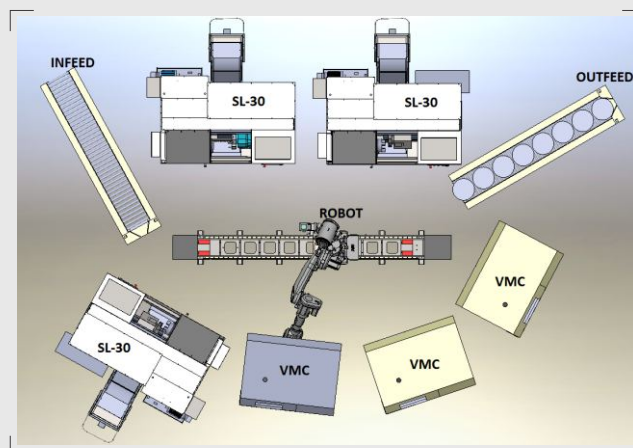
4 Spindle Cell (Top Loaded)



8 Spindle Line (Front Loaded)



Roboturn + OTHER M/C Cell with 7th AXIS



Please check the **Roboturn** catalogue for full details.

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 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](#)



Essential **INDUSTRY 4.0** solutions

SmartFAC

SmartPredict

SmartCorrect



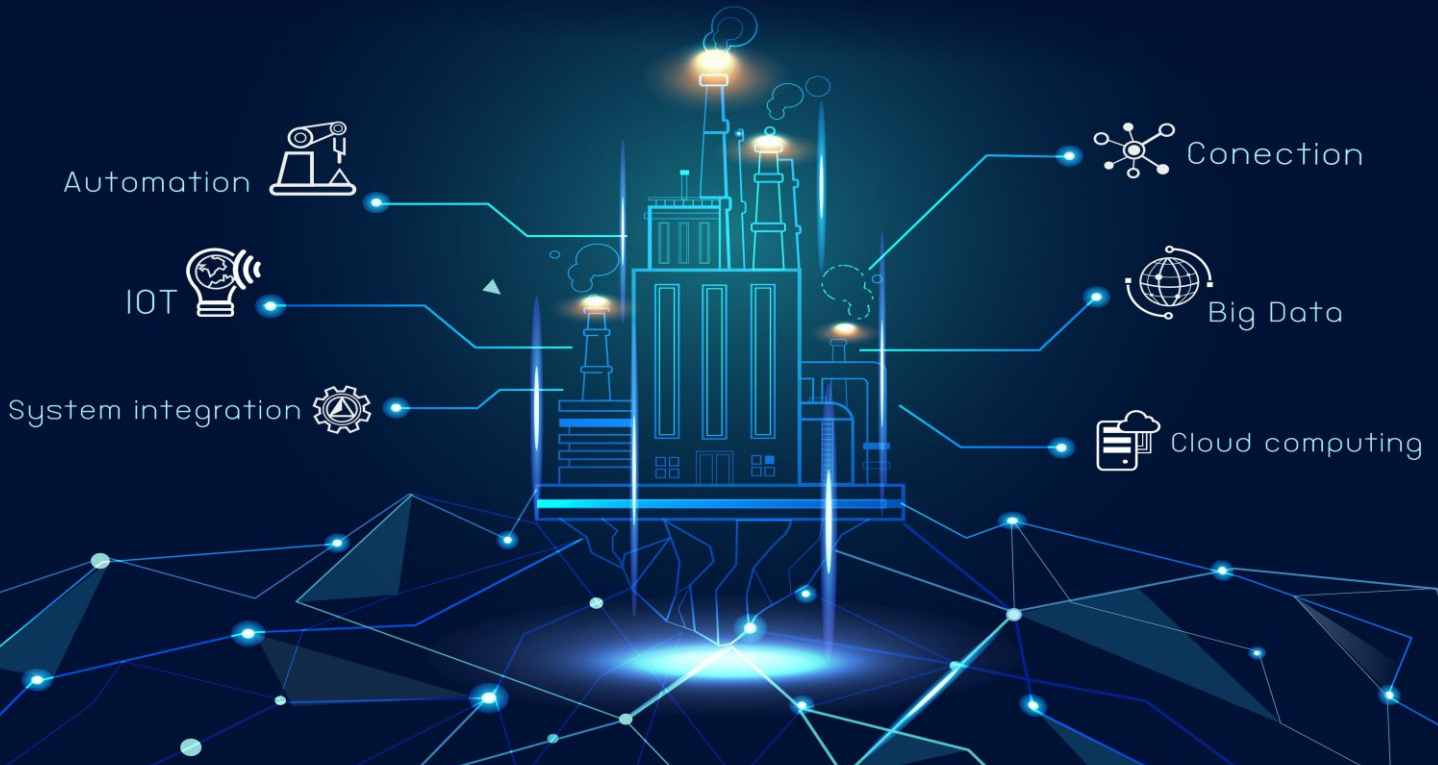
Productivity



Machine Health



Quality



The **BIG Problems** of Machine Shops

- Shortage of Skilled Manpower
- High Rejection & Rework
- Poor Productivity (OEE)
- Sudden Breakdown of Machines

The Solutions

The THREE ESSENTIAL Industry 4.0 technologies

- **SmartFAC** (Universal Machine Monitoring)
- **SmartPredict** (Predictive Maintenance)
- **SmartCorrect** (Closed Loop Auto-corrected Production)

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

SmartFAC-Universal



Lean and fast
maintenance



OEE of
each asset



Accurate costing
of jobs



Avoiding
Surprise Breakdowns

ESSENTIAL Industry 4.0 Technology #2 for Machine Health

SmartPredict (Predictive Maintenance)

PRINCIPLES:

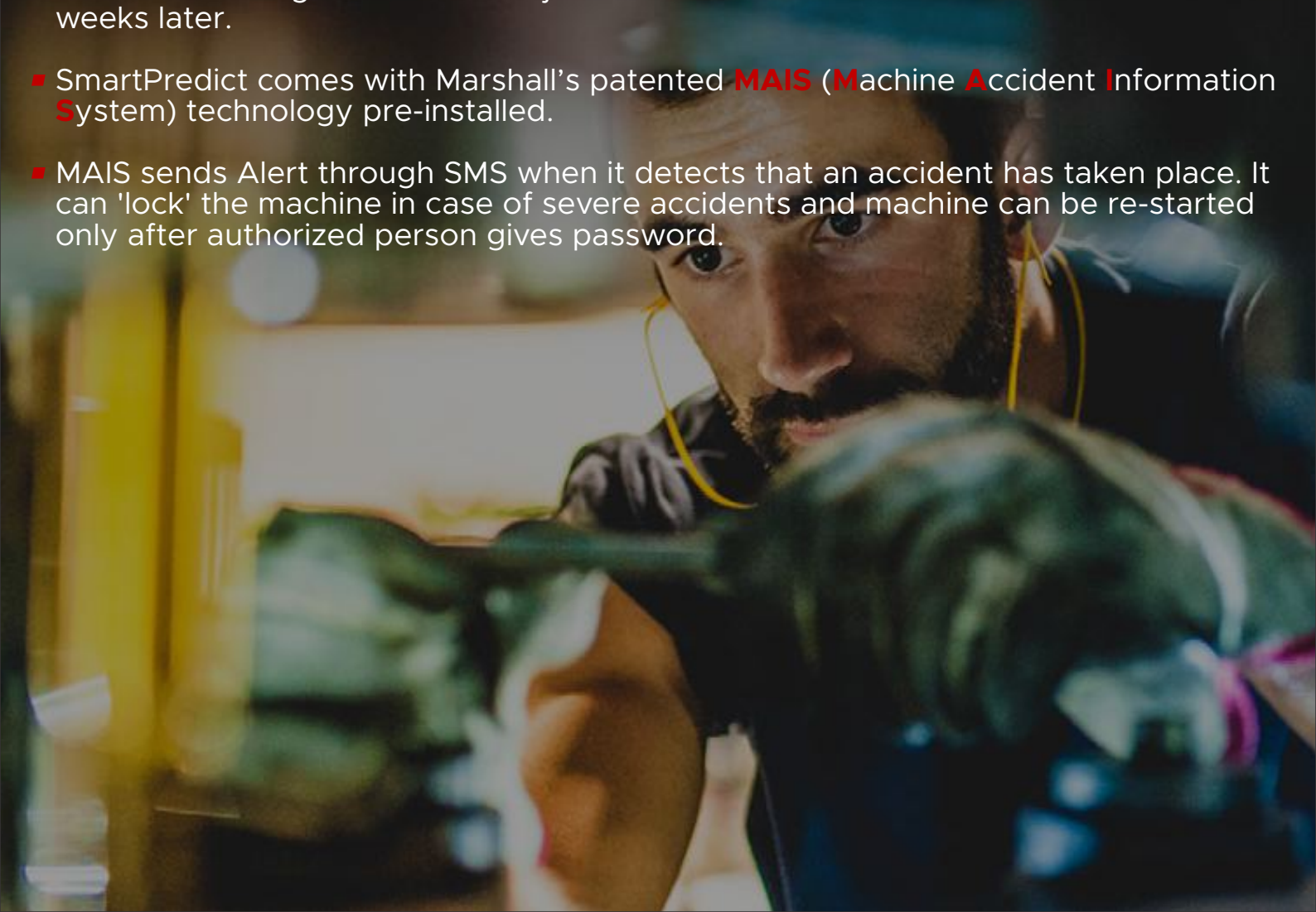
- Symptoms are used to detect potential problem
- Detection of symptoms is system based, & independent of human judgement
- Single or multiple symptoms (variables) may be used to detect problem with the help of rules or algorithms.
- Symptoms are detected with **IoT enabled SENSORS**

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?

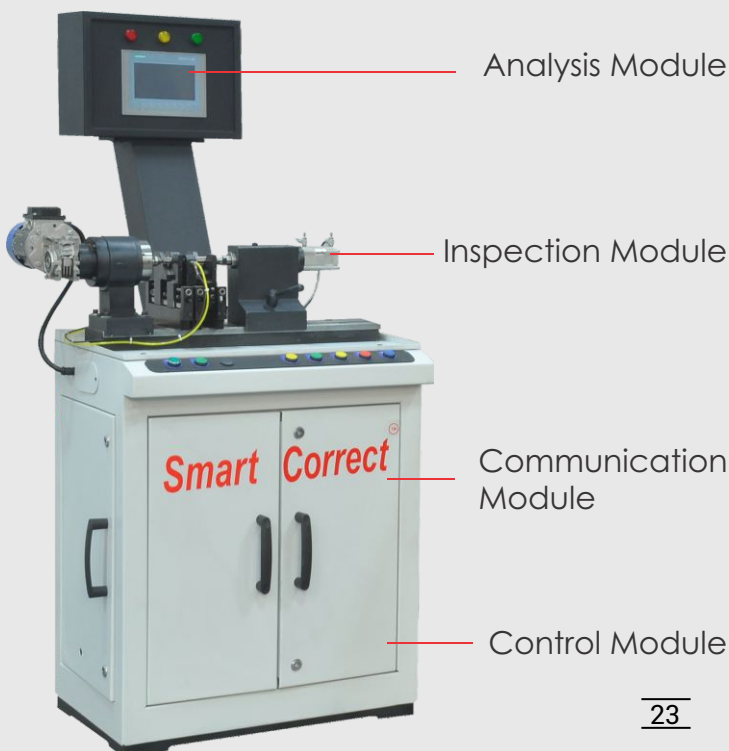


**Error #3
Input**

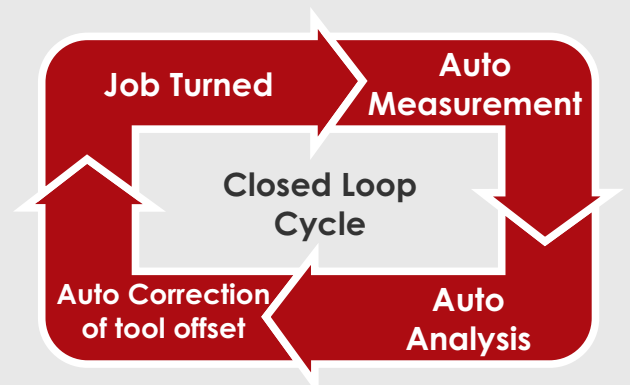
e.g. 0.04 value given in
place of 0.004

Result: Defectives

The Solution



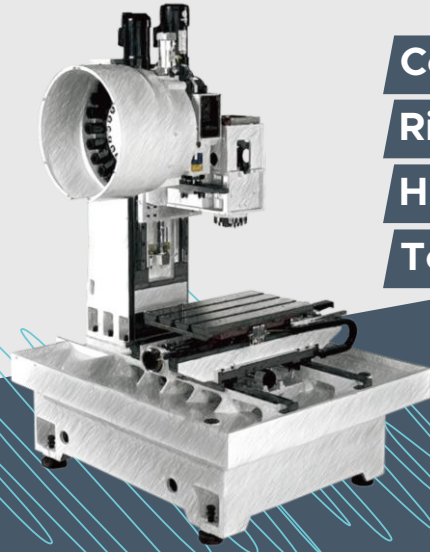
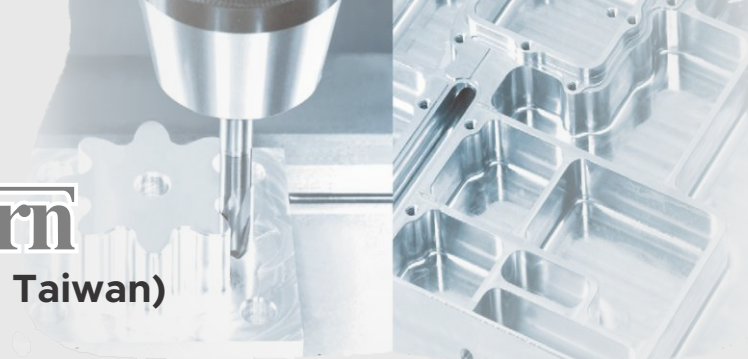
SmartCorrect[®] Gaging
Station for Autocorrection
of machine offsets



Launched



Vertical Machining Centers (Made in Taiwan)



Compact
Rigid
High Speed
Top Quality

	VF 500	VF 700	VTW 540
Table Size	650 x 380mm	850 x 400mm	680 x 400mm
No. of Tools	20	20	24
Max. Speed	15,000	12,000	15,000
Rapids	48 m/min.	48 m/min.	60 m/min.

OUT PERFORMS Imported Drill Tap Centers



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