

## **CNC Barwork Turning Center**

## **BX-Series**

## **Sales Manual**



2<sup>nd</sup> Edition Aug-2005

# Main Feature

\* Simultaneous machining operation BX series feature traversable No.2-spindle (R-SP) with 2-axis movement "X" and "Z' which combined with linear type turret enables simultaneous front and backside machining operations.

The cutting cycle has been reduced by 35 ~ 50% compared to twin spindle and single turret







**Built-in Motor for Sub Spindle** 

X-Spindle unit

![](_page_2_Picture_3.jpeg)

**Double Z-Spindle** 

\* **Rigidity & Less Idle time** The built-in spindle motors of L and R-spindle (3.7/2.2kW) provide fastest possible acceleration and deceleration times, and possible heavy machining operation by adoption of a high rigidity linear guide.

Rapid feed of all axis are 24m/min provide reduce idle time.

## \* Reduce Bar feeding Time

BX series performs bar feeding operation during cut-off operation.

![](_page_3_Figure_2.jpeg)

### \* 3D Tooling

Linear turret system ensures fast tool setting and promotes easier programming with minimum idle of slide movement, also ensure uninterrupted cutting chip flow.

![](_page_3_Picture_5.jpeg)

## \* Easy Set-up of Tools Offset

1) In case of O.D. tools (L-slide)

TOOL SETTING HD - 1VER: 1.00 26.000 WORK SIZE = (D= 8.000 - 26.000 mm) X-AXIS\_1 X-AXIS\_2 Y-AXIS TOOL TO SPINDLE = 164.000 135.000 250.000 (TOOL BASE - SPINDLE CENTER) 20.000 TOOL 35.000 35.000 CUT-OFF 30.000 NOT USED NOT USED APPROACH SHIFT = 1.000 1.000 1.000 G100 : TOOL SET POS. (T1-T6): T\_ G100; (MDI) G101 : TOOL SET POS. ESCAPE: G101; (MDI) G102 : CUT-OFF APPROACH POS. (X AXIS) G103 : TOOL APPROACH POS.X\_1 (X AXIS\_1) G104 : TOOL APPROACH POS.X\_2 (X AXIS\_2) G105 : TOOL APPROACH POS.Y (Y AXIS) NUM= >^ CONDIT OFFSET OFFSET GEOMET WEAR

- a. Input the diameter of material, the length of tools and cut-off tools from holder on TOOL SETTING SCREEN.
- b. Input [T1G100] in MDI mode, and press [CYCLE START] button. Slide will be moved automatically to cut-off position.
- c. Clamp tools after touching to material.
- d. Input [X26.0] and press [MEASURE] button. Amount X-104.0 will be registered into offset of T1.
- 2) Incase of drill & I.D. tools

Press [MEASURE] button after a tool touches to setting gauge.

![](_page_4_Picture_9.jpeg)

**L-Slide** 

Setting Gauge

**R-Slide** 

## \*Saving Floor Space

1,257 x 1,990 mm (without chip conveyor)

![](_page_5_Figure_2.jpeg)

## \* Manual Handle Retrace Function (Option)

New job program movement can be easily checked by using manual retrace function to avoid any interference of tool & a workpiece. Manual retrace can use forward movement with manual pulse generator.

Notice:

It will not be operated correctly if reversing movement after reading waiting M-code.

![](_page_5_Picture_7.jpeg)

## \* Optional Accessories

#### **1. Cut-off Confirmation**

Newly developed electrical cut-off confirmation system can be detected whether cut-off operation has been done.

#### 2. Parts Catcher & Conveyor

Parts catcher receives the finished a workpiece ejected by sub spindle. And conveyor brings out of machine.

![](_page_6_Picture_5.jpeg)

**Parts Catcher** 

**Parts Conveyor** 

#### **3. Disk Brake for L-Spindle**

Disk brake system provides high griping force on spindle for milling operation.

![](_page_6_Picture_10.jpeg)

#### 4. High Pressure Coolant

One GRUNDFOS's pump provides high pressure coolant for L, R-Slide and R-Spindle inner coolant. Maximum pressure is about 1MPa (11 Kgf/cm2) and pressure of coolant holds 1MPa even if it discharges coolant by 3 points.

#### 5. Long Shaft System

Enables efficient processing of precision, small-diameter long shaft bar work on a single machine, which used to require multiple machines.

## Mirror Image Function

#### Explanations

Mirror image can be applied to X-axis with G code. X-axis sign is reversed from the programmed command.

![](_page_7_Figure_3.jpeg)

#### Format

G68 : Mirror Image ON G69 : Mirror Image cancel

#### Examples

Mirror Image OFF	Mirror Image ON
07777	07777
Т0000	Т0000
	G69
G28 X0	G28X0
T0303	T0303
G00 X20.0	G00 X20.0
G01 X40.0 F100	G01 X40.0 F100
	G68
T1313	T1313
G01 X-20. F100 Sign is reversed	G01 X20. F100
G0 X-40 Sign is reversed	G0 X40.
X0	X0
	G69
Т0000	T0000
M30	M30

#### Notice:

1) When automatic operation is stopped in mirror image effective, please cancel the mirror image mode by MDI mode (G69).

## **Machine Specification**

	lte	Unit	BX20/26				
Machining	1	Max. Turning Dia.	mm	20 / 26			
Capacity	Max. Tur	ning Length (Long	mm	67 (255)			
		No. of Spindle			2		
	Speed Range	L-S	SP.	min <sup>-1</sup>	80-8000		
	Opeeu Range	R-S	SP	min <sup>-1</sup>	80-8000		
Spindle	Boaring LD	L-S	SP.	mm	80		
	Dearing i.D.	R-S	SP	mm	80		
		L-S	SP .	mm	28		
	Closing Tube I.D.	R-S	SP .	mm	28		
	No. of Turret				2		
	Type of Turret	Slide Un	it No.1		Linear Type		
	Type of Turret	Slide Un	it No.2		Linear Type		
		No of Tools	Slide No.1	рсе	18		
		Incl. Driven Tools	Slide No.2	рсе	7		
	No. of Tools	OD Tools(LSP)	Slide No.1	рсе	6		
	110. 01 10015	ID Tools(LSP)	Slide No.2	рсе	3		
		OD Tools(LSP)	Slide No.1	рсе	4		
Turrot		ID Tools(LSP)	ID Tools(LSP) Slide No.2 pce		4		
Turret		OD Tools	Slide No.1	mm	16		
	Size of Tools		Slide No.2	mm	16		
	0120 01 10013	ID Tools	Slide No.1	mm	20		
		10 10013	Slide No.2	mm	20		
		Drill (L	SP)	mm	12		
	Machining	Tap (L	- SP)	mm	M8		
	Capacity	Drill (R	-SP)	mm	12		
	Capacity	Tap (R	-SP)	mm	M8		
		Type of	Collet		ER16		
	No. of Tools	Slide Un	it No.1	рсе	X4 + Z4 (Total 8)		
		Slide Un	it No.2	рсе			
Driven Tools			Drill	mm	8		
	Capacity	Slide Unit No 1	Тар	mm	M6		
	Cupacity		Speed Range	min <sup>-1</sup>	100-4000		
			Type of Collet		ER16		

## **Machine Specification**

	Item	Unit	BX20/26		
		Slide No 1	X1		Linear Guide
		Y Silde NO.1			Linear Guide
	Type of Slide	L-SP	Z1		Linear Guide
		Slide No.2	Y2		Linear Guide
		R-SP	X2		Linear Guide
		11-01	Z2		Linear Guide
		Slide No 1	X1	mm	135
			Y1	mm	260
Slide	Stroke	L-SP	Z1	mm	70
	Ottoke	Slide No.2	Y2	mm	215
		R-SP	X2	mm	180
			Z2	mm	238
		Slide No 1		m/min	24
			Y1	m/min	24
	Rapid Feed	L-SP	Z1	m/min	24
	Rapid Feed	Slide No.2	Y2	m/min	24
		R-SP	X2	m/min	24
				m/min	24
		Slide No 1	X1	N	1847
			Y1	Ν	3325
	Force	L-SP	Z1	Ν	1847
	10100	Slide No.2	Y2	Ν	3325
		R-SP	X2	Ν	1847
			Z2	Ν	1847

## **Machine Specification**

	Spindle Motor	L-SP	kw	3.7/2.2		
	(Built-in)	R-SP	kw	3.7/2.2		
		Slide No 1 X1		kw	0.5	
Motor Image of the motor Image of the motor Image of the motor   (Built-in) R-SP kw 3.77   Axis Motor Slide No.1 X1 kw 0.71   Axis Motor L-SP Z1 kw 0.71   Axis Motor L-SP Z1 kw 0.71   Motor R-SP Z2 kw 0.72   Driven Tools motor Slide Unit No.1 kw 0.72   Mutor Hydraulic Pump Motor kw 0.72   Hydraulic Pump Motor kw 0.72   Kw 0.72 kw 0.72   Motor Hydraulic Pump Motor kw 0.72   High Pressure Coolant Pump Motor kw 0.72   High Pressure Coolant Pump Motor kw 0.72   High Pressure Coolant Oli L 14   Lubrication Motor kw 0.72   Required Power Capacity KVA 22   Required Power Capacity KVA 22   Required Power Supply V/Hz AC200/22   Required Power Supply V/Hz AC200/22   Required Compressed Air Mpa 0.74   M(C Dimension Height from Floor mm 10   He	0.75					
	0.5					
		Slide No.2	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
Motor		R_SP				
WOTO		Z2		kw	0.5	
-	Driven Tools	Slide Unit No 1		kw	0.5	
	motor		kw	0.5		
	Нус	draulic Pump Motor	kw	0.75		
	Co	olant Pump Motor	kw	0.25		
	High Pres	ssure Coolant Pump Motor	kw	0.85		
	L	ubrication Motor	kw			
		Hydraulic Oil	L	10		
Tank Capacity		R - SPkw $3.7/2.2$ Slide No.1X1kw $0.5$ Y1kw $0.5$ Slide No.2Y2kw $0.75$ L - SPZ1kw $0.5$ Slide No.2Y2kw $0.75$ R - SPZ2kw $0.5$ Slide Unit No.1kw $0.5$ aulic Pump Motorkw $0.5$ aulic Pump Motorkw $0.75$ ulant Pump Motorkw $0.25$ brication Motorkw $0.25$ brication Motorkw $0.25$ brication Motorkw $0.85$ brication Motorkw $0.85$ brication OilL10Coolant OilL100colant OilL100colant OilL100ed Power CapacityKVA20ired Power SupplyV/HzAC200/220 50/60red Fuse CapacityA60ed Compressed AirMpa $0.5$ e Height from Floormm1000Heightmm1670with Chip Conveyor)LmmWeightkg3000EANUC18i-TB (2-Channel)				
		Lubrication Oil		L		
	Requ	ired Power Capacity		KVA	20	
Power Source	Req	$\begin{tabular}{ c c c c c c } \hline R-SP & kw & 3.7/2.2 \\ \hline Slide No.1 & X1 & kw & 0.5 \\ \hline Y1 & kw & 0.5 \\ \hline Y1 & kw & 0.75 \\ \hline L-SP & Z1 & kw & 0.5 \\ \hline Slide No.2 & Y2 & kw & 0.5 \\ \hline Slide No.2 & Y2 & kw & 0.5 \\ \hline R-SP & Z2 & kw & 0.5 \\ \hline Z2 & kw & 0.5 \\ \hline Slide Unit No.1 & L & 10 \\ \hline Coolant Pump Motor & kw & 0.85 \\ \hline Lubrication Motor & kw & 0.85 \\ \hline Lubrication Oil & L & 10 \\ \hline Coolant Oil & L & 10 \\ \hline Coolant Oil & L & 140 \\ \hline L & 100 \\ \hline Coolant Oil & L & 0 \\ \hline cquired Power Capacity & KVA & 20 \\ \hline equired Power Supply & V/Hz & AC200/220 50/60 \\ \hline equired Fuse Capacity & A & 60 \\ \hline cquired Compressed Air & Mpa & 0.5 \\ \hline indle Height from Floor & mm & 1000 \\ \hline Height & mm & 1670 \\ \hline ze (with Chip Conveyor) & L & mm & 2220 (3060) \\ \hline W & mm & 1305 \\ \hline Weight & kg & 3000 \\ \hline FANUC & 18i-TB (2-Channel) \\ \hline \end{tabular}$				
	Req	uired Fuse Capacity		А	60	
	Requ	ired Compressed Air	Мра	0.5		
	Spino	dle Height from Floor	mm	1000		
		Height	mm	1670		
M/C Dimension	Floor Size	(with Chin Conveyor)	L	mm	2220 (3060)	
	11001 0120		mm	1305		
		Weight	kg	3000		
NC		FANUC			18i-TB (2-Channel)	

Note:

The specifications are subject to change without notice.

## **External View**

**BX-20/26S** 

![](_page_12_Figure_2.jpeg)

## \* Collet Chuck System (L & R-Spindle)

#### **BX-20S (DIN148E)**

![](_page_13_Figure_2.jpeg)

#### **BX-26S (DIN161E)**

![](_page_13_Figure_4.jpeg)

![](_page_14_Figure_0.jpeg)

![](_page_15_Figure_0.jpeg)

![](_page_16_Figure_0.jpeg)

![](_page_17_Figure_0.jpeg)

![](_page_17_Figure_1.jpeg)

REVISIONS	COMMON TOLERA	NCE	ROUGHNES	SS OF SURFACE	FINISH										Ea.	
N0.	(MIDDLE CLAS	+01	NOTED:	LESS OTHERWISE	PROCESS		PART NUMBER	PAF	RT NAME	MATE	RIAL	REM	ARKS	NO.F	EQ UNIT	1
N0.	6 TO TOWAX	±0.1	VAAA7	0.15 ~ 0.85	HEAT		TYPE:			۸1	APP.B	CHKD.BY	CHKD.BY	DSGN.BY	DWG.BY	1
2 04/28/05 NO.054M053 EXCH.	6 TO JUMAX	10.2	****		IREA IMENT		-		SCALE	AL				01/13/05	04/26/05	4
1 01/25/05 NO.054M015 EXCH.	30 TO 120MAX	±0.3		0.8S ~ 6.3S	HARDENING		BX-20	/26S		1:2				TSUKADA	TSUKADA	
	120 TO 315MAX	±0.5	777	6 3S ~ 25S	HARDNESS		TITLE					PT NO	4 14	780	002	10
	315 TO 1000MAX	±0.8	**	0.05 200								11.110.	14101	/ 00	<u>502</u>	Ŧ
	1000 TO 2000MAX	±1.2	$\nabla$	25S ~ 100S	PAINTING		TOOLIN	NG SY	STEM	(mm)		DWG.NO	4M	780	DOB	
	REVISIONS No. 2 04/28/05 No.054M053 EXCH. 10 1/25/05 No.054M015 EXCH.	REVISIONS     DOMMON TIGER       NO.     (MUDDE LLAS       2     04/28/05 No.054M053 EXCH.     6 10 30MAX       10 1/25/05 No.054M015 EXCH.     30 10 120MAX     120 10 31MAX       10 1/25/05 No.054M015 EXCH.     130 10 030MAX     100 10 30MAX       10 10/25/05 No.054M015 EXCH.     130 10 030MAX     100 10 30MAX	REVISIONS     COMMON TOLERANCE       NO.     (MODE CLAS)       10     2     04/28/05 No.054M053 EXCH.       10     17/25/05 No.054M055 EXCH.     10       10     17/25/05 No.054M055 EXCH.     10       10     17/25/05 No.054M055 EXCH.     10       10     17/25/05 No.054M05 EXCH.     10       10     10     20MAX 40.3       10     20     10     20MAX 40.4	REVISIONS     COMMON TOLEPANCE     Produment       NO.     (MODE LASS)     Product     Product       2 04/28/05 NO.054MI053 EXCH.     61 03 3044xt     40.3     VVV       10 17/25/05 NO.054MI015 EXCH.     30 T0 13044xt     40.3     VVV       10 07/25/05 NO.054MI015 EXCH.     10 T0 31944xt     40.3     VVV       10 07/25/05 NO.054MI015 EXCH.     10 T0 31944xt     40.3     VVV	REUSIONS     COMMON TOLERANCE     Requests of survace (MUDIC LASS)     Requests of survace NoTIC       N0.     64/2     000/2     VOTV     0.15     0.05       10 01/25/05 N0.054M055 EXCH.     30 T0     120MX     ±0.3     VVVV     0.15     0.05       10 01/25/05 N0.054M015 EXCH.     120 T0     315MX     ±0.5     VV7     6.35     < 255	REUNISONS     COMMON TOLERANCE (MODE CLASS)     Reduncess of surface MODE     PRIVACE INFO     PRIVACE INFO     PRIVACE INFO <td>REVISIONS     COMMON TOLERANCE (MUDDE LEGISTANCE MUDDE LEGISTANCE MUDDE LEGISTANCE MUDDE LEGISTANCE MUDDE LEGISTANCE NO.     MOUGHNESS of Summers Providences of Summers NO.     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PART NUMBER     PROCESS     PART NUMBER       2     04/28/05 NO.054M055 EXCH.     61 00     300 10     20MAX     40.3     VVV     0.15 ~ 0.85     SURFACE     BX-20       10     01/25/05 NO.054M055 EXCH.     30 10     120MAX     40.3     VVV     0.85 ~ 6.35     SURFACE     BX-20       10     10/25/05 NO.054M015 EXCH.     10 10 100MAX     40.3     VV     6.56 ~ 2.55     HARDREING     BX-20       10     10/10 10 100MAX     40.3     VV     6.56 ~ 2.55     HARDREING     BX-20       10     100 10 100MAX     40.4     VV     6.56 ~ 2.55     HARDREING     TITLE:       1000 10 200MAX     41.2     V     258 ~ 1005     PAIT NIG     TOOL11</td> <td>REVISIONS     COMMON TOZERANCE (MODE CASS)     Revidences of summarkee (MODE CASS)     INNISH PROCESS     PART NUMBER     PART PART NUMBER       0.0     exav 1 = 0.1     mode     mode     mode     mode     mode     part number     part       10.1     0.4/28/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VVV     0.15 ~ 0.85     BIRFACE     BIRFACE     BX-20/26S       10.1/25/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VVV     0.85 ~ 6.55     BIRFACE     BX-20/26S       10.1/25/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VV     0.85 ~ 6.55     HARDNESS     TITLE:       10.1/25/05 N0.054M015 EXCH.     10 to 100MX4 40.8     VV     6.35 ~ 255     HARDNESS     TITLE:       10.1/25/05 N0.054M015 EXCH.     10 to 100MX4 40.8     VV     6.35 ~ 255     HARDNESS     TITLE:       10.0     10 to 000MX4 41.2     V     25 ~ 1005     PANTING     TOOLLING SY</td> <td>REVISIONS     COMMON TOLFANCE     POWOMENTS of SUFFACE     PINISH     PART NUMBER     PART NUMBER</td> <td>REVISIONS     COMMON TOLERANCE (MUDDE LESS OTHERNEC PARTS)     PART NUMBER     PART NUMBER     PART NUMBER     PART NUMBER     MATE       NO.     6 N0.3     6 N0.3     6 N0.3     10 NTEL     TYPE:     A     A       2 04/28/05 N0.054M053 EXCH.     5 N0.3 MWX ± 0.01     VVVV     0.15 ~ 0.85     #EXT REALINET     TYPE:     A1     A1       10 1/25/05 N0.054M051 EXCH.     30 T0 120MX ± 0.03     VVV     0.85 ~ 0.55     SRF ACE     BX-20/26S     SCALE     A1       10 1/25/05 N0.054M015 EXCH.     10 0 315MX ± 0.05     VV     6.35 ~ 255     HARDNESS     TITLE:       10 01/25/05 N0.054M015 EXCH.     10 000MX ± 0.08     VV     6.35 ~ 255     HARDNESS     TITLE:</td> <td>REWSIONS     COMMICH TOLERANCE (MUDEL CLASS)     Requestess of sample. (MUDEL CLASS)     Product Notice (MUDEL CLASS)     Product N</td> <td>REVISIONS     COMMON TOCRANCE (MUCC)     PROGENESS OF SUMPACE (MUCC)     FINISH PROGENESS OF SUMPACE (MUCC)     PROGENESS OF SUMPACE (MUCC)     PROGENESS OF SUMPACE (MUCC)     PROGENESS OF S</td> <td>REVISIONS     COMUNIT TO ERVICE (MUDIC LASS OF BRIVACE MODE.     PNISH PART NUMBER     PART NUMBER     PART NUMBER     MATERIAL     PREMINIST PREMINIST       2     04/28/05 N0.054M053 EXCH.     6 TO 304AM \$40.3     VVVV     0.15 ~ 0.85     SURFACE TEXTINGING     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY CHKD.BY L1 2     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY CHKD.BY L1 2     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY</td> <td>REVISIONS     COMMON TOERANCE (MUDE LESS Officience MUDE LESS OFFICIENCE MUD LESS OFFICIENCE MUDE LESS OFFICIENCE MUD LESS OFFICIENCE MUD LES</td> <td>REVISIONS     COMMON TOLERANCE     Invision     Ea.     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PART NUMBER     PROCESS     PART NUMBER       2     04/28/05 NO.054M055 EXCH.     61 00     300 10     20MAX     40.3     VVV     0.15 ~ 0.85     SURFACE     BX-20       10     01/25/05 NO.054M055 EXCH.     30 10     120MAX     40.3     VVV     0.85 ~ 6.35     SURFACE     BX-20       10     10/25/05 NO.054M015 EXCH.     10 10 100MAX     40.3     VV     6.56 ~ 2.55     HARDREING     BX-20       10     10/10 10 100MAX     40.3     VV     6.56 ~ 2.55     HARDREING     BX-20       10     100 10 100MAX     40.4     VV     6.56 ~ 2.55     HARDREING     TITLE:       1000 10 200MAX     41.2     V     258 ~ 1005     PAIT NIG     TOOL11	REVISIONS     COMMON TOZERANCE (MODE CASS)     Revidences of summarkee (MODE CASS)     INNISH PROCESS     PART NUMBER     PART PART NUMBER       0.0     exav 1 = 0.1     mode     mode     mode     mode     mode     part number     part       10.1     0.4/28/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VVV     0.15 ~ 0.85     BIRFACE     BIRFACE     BX-20/26S       10.1/25/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VVV     0.85 ~ 6.55     BIRFACE     BX-20/26S       10.1/25/05 N0.054M055 EXCH.     10 to 100MX4 40.3     VV     0.85 ~ 6.55     HARDNESS     TITLE:       10.1/25/05 N0.054M015 EXCH.     10 to 100MX4 40.8     VV     6.35 ~ 255     HARDNESS     TITLE:       10.1/25/05 N0.054M015 EXCH.     10 to 100MX4 40.8     VV     6.35 ~ 255     HARDNESS     TITLE:       10.0     10 to 000MX4 41.2     V     25 ~ 1005     PANTING     TOOLLING SY	REVISIONS     COMMON TOLFANCE     POWOMENTS of SUFFACE     PINISH     PART NUMBER     PART NUMBER	REVISIONS     COMMON TOLERANCE (MUDDE LESS OTHERNEC PARTS)     PART NUMBER     PART NUMBER     PART NUMBER     PART NUMBER     MATE       NO.     6 N0.3     6 N0.3     6 N0.3     10 NTEL     TYPE:     A     A       2 04/28/05 N0.054M053 EXCH.     5 N0.3 MWX ± 0.01     VVVV     0.15 ~ 0.85     #EXT REALINET     TYPE:     A1     A1       10 1/25/05 N0.054M051 EXCH.     30 T0 120MX ± 0.03     VVV     0.85 ~ 0.55     SRF ACE     BX-20/26S     SCALE     A1       10 1/25/05 N0.054M015 EXCH.     10 0 315MX ± 0.05     VV     6.35 ~ 255     HARDNESS     TITLE:       10 01/25/05 N0.054M015 EXCH.     10 000MX ± 0.08     VV     6.35 ~ 255     HARDNESS     TITLE:	REWSIONS     COMMICH TOLERANCE (MUDEL CLASS)     Requestess of sample. (MUDEL CLASS)     Product Notice (MUDEL CLASS)     Product N	REVISIONS     COMMON TOCRANCE (MUCC)     PROGENESS OF SUMPACE (MUCC)     FINISH PROGENESS OF SUMPACE (MUCC)     PROGENESS OF SUMPACE (MUCC)     PROGENESS OF SUMPACE (MUCC)     PROGENESS OF S	REVISIONS     COMUNIT TO ERVICE (MUDIC LASS OF BRIVACE MODE.     PNISH PART NUMBER     PART NUMBER     PART NUMBER     MATERIAL     PREMINIST PREMINIST       2     04/28/05 N0.054M053 EXCH.     6 TO 304AM \$40.3     VVVV     0.15 ~ 0.85     SURFACE TEXTINGING     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY CHKD.BY L1 2     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY CHKD.BY L1 2     TYPE:     SCALE     A1     APP.BY CHKD.BY L1 2     APP.BY	REVISIONS     COMMON TOERANCE (MUDE LESS Officience MUDE LESS OFFICIENCE MUD LESS OFFICIENCE MUDE LESS OFFICIENCE MUD LESS OFFICIENCE MUD LES	REVISIONS     COMMON TOLERANCE     Invision     Ea.     Ea.<

![](_page_18_Figure_0.jpeg)

![](_page_19_Figure_0.jpeg)

## \* Sample Parts 1

Material: DIN1.4305(X12 CrNiS 18 8) Diameter of material: f 26mm Cycle time: 262 sec/pce

![](_page_20_Picture_2.jpeg)

![](_page_20_Figure_3.jpeg)

![](_page_20_Picture_4.jpeg)

![](_page_21_Picture_0.jpeg)

Material: DIN1.0715 (9 SMn 28) Diameter of material: f 18mm Cycle time: 240 sec/pce

![](_page_21_Picture_2.jpeg)

![](_page_21_Figure_3.jpeg)