```
[Info]
Version = 3.28
CheckChange = 13ff6a4f
PLCFileName = Mill55.awl
//.*********************************************.**********************
//.*.*
//.*.PLC.PROGRAM.FOR.THE.PCM55.*
//.*.FROM.VERS..3.00.AC95.and.ACC.*
//.*.*
//.*.Designed.by.Friedrich.Schörghofer.April.19,.2002.*
//.*.*
//.*********************************************.**********************
//...TABLE.OF.CONTENTS:
//
//.OB.1.ORGANIZATIONAL.BLOCK
//.SIMULATE.FC.0.TOOL.TURNER
//.FC.1.INITIALIZATIONS
//.FC.2.ITEM.COUNTER
//.FC.3.MAIN.DRIVE.FELDERER.FU
//.FC.33.MAIN.DRIVE.LENZE.FU
//.FC.4.OPERATING.MODES
//.FC.5.AXES.READINESS
//.FC.6.AXES.JOG,.INC
//.REFERENCE.FC.7.AXES
//.FC.8.AUX_ON.AC95
//.FC.88.AUX_ON.AC95./.AC88.CONVERSION.TO.ACC
//.FC.9.AUX_ON.ACC
//.FC.10.AT.PROGRAM.END.RESET.OR.RESTART
//.FC.11.NC.START.AND.NC.STOP.FROM.M0.OR.M1
//.FC.12.AFG./.EFG
//.FC.13.NC.STARTVERR..AND.CONTROL.BUTTONS
//.FC.14.ALARM.STATUS
//.FC.16.PLC->.SURFACE.SIGNALS
//.FC.17.AUTOMATIC.DOOR
//.FC.18.tbsp..VICE
//.FC.21.PARTIAL.APPLIANCE
//.BLOW.OUT.FC.22
//.FC.23.SAFETY.CIRCUIT.ACC
//.FC.26.COOLANT.(M8./.M9)
//.FC.30.PNEUMATIC.CLAMPING.DEVICE
//.FC.32.AUTOMATICALLY.SWITCH.TO.BA.REF
//.FC.34.ASSIGN.THE.INPUTS.AC95.-.ACC
//.FC.35.ASSIGN.THE.OUTPUTS.AC95.-.ACC
//.FC.40.ROBOTICS.INTERFACE
//.FC.41.RENISHAW.PROBE
//.FC.49.ADOPT.TOOL.POSITIONS.INTO.MILL55_ACC.MSD
//.FC.50.TOOL.TURNERS
//.FC.51.TOOL.CLAMPING.SYSTEM
//.SET.FC.52.TOOL.POSITION.FROM.THE.SETTING.DATA
//.FC.53.CHECK.NEW.T-WORD.AND.DETERMINE.NEW.TOOL.DISC.POSITION
//.RETURN.FC.54.TOOL.1
//.Return.FC.55.TOOL.0.OR.NO.TOOL
//.Return.FC.56.TOOLS.2.TO.8
//.FC.57.PICK.UP.TOOL.1
//.FC.58.PICK.UP.TOOL.0
//.FC.59.PICK.UP.TOOLS.2.TO.8
//.FC.60.Z-AXIS.TRAVEL.TO.TARGET.POSITION
//.FC.61.A-AXIS.TRAVEL.TO.TARGET.POSITION
//.FC.62.LED.CONTROL
//.FC.63.WARNING.LIGHT
//.FC.64.M0.TRIP.WITH.TXX.and.CAMCONCEPT
//.TRIGGER.FC.65.M0.and.move.up.the.Z-axis.with.TXX.and.Sinumeric.Operate
//.FC.66.HANDWHEEL
//
```

```
65   //·SETTING·BIT'S·FOR·COMMISSIONING·AND·SERVICE:
66   //·M·200.0·=·0·FOR·SETTING·THE·TOOL·REFERENCE·POINT
67   //·M·200.0·=·1·TOOL·AXIS·TRAVELS·TO·0·DEGREES·AFTER·REFERENCING
68   //·SET·THE·TOOL·POSITIONS·AND·APPLY·TO·THE·MSD·FILE
69   //·ADOPT·THE·POSITION·FOR·Z-AXIS·T1-T8·EXPRESSION·AND·RECOVERY·POSITION
70   //·PULL·IN·TOOL·AND·EXIT·WITH·"CTR·^"
71   //·M·300.0·DOOR·AUTOMATICALLY·OPEN·/·CLOSE·VIA·PLC
72   //
73   //
74   //·EASY·CYCLE-·WINNC-·PC·key·assignment·MILL·/·TURN55:
75   //
76   //·ALT·U·CTR·^·DB20.DBX·294.2·CHUCK·OPEN·/·CLOSE
77   //·ALT·K·CTR·1·DB20.DBX·294.5·WZW·SWIVEL·FURTHER·ONE·POSITION·TURN55
78   //·ALT·K·CTR·1·DB20.DBX·294.5·EXTRACT·/·PULL·IN·TOOL·MILL55
79   //·ALT·O·CTR·2·DB20.DBX·294.6·BLOW·OUT·ON·/·OFF·(M71-ON,·M72-OFF)
80   //·ALT·O·CTR·2·DB20.DBX·294.6·MINIMUM·QUANTITY·COOLING·ON·/·OFF·Q·3.5·(M7-ON,·M9-OFF)
81   //·(ONLY·IF·THE·BLOW·DEVICE·IS·NOT·ACTIVATED)
82   //·ALT·I·CTR·3·DB20.DBX·294.1·SWIVELING·PART·UNIT·ONE·DIVISION·(M27)
83   //·ALT·X·CTR·4·DB20.DBX·295.1·FEED·STOP
84   //·ALT·C·CTR·5·DB20.DBX·295.2·FEED·START
85   //·ALT·V·CTR·6·DB20.DBX·295.3·SPINDLE·STOP
86   //·ALT·B·CTR·7·DB20.DBX·295.4·SPINDLE·START
87   //·ALT·N·CTR·8·DB1.DBX·1374.4·AUXILIARY·DRIVES·ON
88   //·ALT·H·CTR·9·DB20.DBX·294.4·VICE·/·QUILL·FORE·(M26)
89   //·ALT·J·CTR·0·DB20.DBX·294.3·VICE·/·QUILL·BACK·(M25)
90   //·ALT·M·CTR·ß·DB1.DBX·1374.3·AUXILIARY·DRIVES·OFF
91   //·ALT·P·CTR·´·DB1.DBX·1374.2·MACHINE·DOOR·OPEN·/·CLOSE
92   //
93   //·******************·Inputs·and·outputs·for·PCM·55·ACC·**********************.**
94   //
95   //·Applies·to·both·stepper·motor·modules:
96   //
97   //·A·3.7·Enable·differential·line·driver·clocks·for·SM
98   //
99   //
100  //·1.1·Pin·assignment·for·1st·stepper·motor·module·Y5A011000
101  //
102  //
103  //·(-A111)
104  //
105  //·X3:·1·I·0.0·Servo·Ready·X·(physical·axis·0)
106  //·X3:·2·DIR·X
107  //·X3:·3·DIR·X·/
108  //·X3:·4·CK·X
109  //·X3:·5·CK·X·/
110  //·X3:·6·I·0.2·Servo·Ready·Z·(physical·axis·1)
111  //·X3:·7·DIR·Z
112  //·X3:·8·DIR·Z·/
113  //·X3:·9·CK·Z
114  //·X3:·10·CK·Z·/
115  //·X3:·11·I·0.1·Servo·Ready·Y·(physical·axis·2)
116  //·X3:·12·DIR·Y
117  //·X3:·13·DIR·Y·/
118  //·X3:·14·CK·Y
119  //·X3:·15·CK·Y·/
120  //·X3:·16·A·3.0·=·M·17.0·//·ENABLE·AXES·A
121  //
122  //·1.2·Pin·assignment·for·2nd·stepper·motor·module·Y5A011000
123  //·for·tool·turret·MILL·55
124  //
125  //·(-A112)
126  //
127  //·X3:·1·(I·0.3·Servo·SERVO·READY·HA·physical·axis·3)
128  //·X3:·2·(This·line·is·disconnected·on·the·stepper·motor·card·with·it)
```

```
//·X3:·3·(there·is·no·short·circuit·with·the·HA·setpoint·module)
//·X3:·4
//·X3:·5
//·X3:·6·I·0.5·Servo·Ready·tool·turret·DRIVE·(physical·axis·4)
//·X3:·7·DIR·Z
//·X3:·8·DIR·Z·/
//·X3:·9·CK·Z
//·X3:·10·CK·Z·/
//·X3:·11·I·0.4·Servo·Ready·round·axis·DRIVE·(physical·axis·5)
//·X3:·12·DIR·Y
//·X3:·13·DIR·Y·/
//·X3:·14·CK·Y
//·X3:·15·CK·Y·/
//·X3:·16·A·3.1·ACC·ONLY·//·AXES·ENABLE·B
//
//
//·2nd·pin·assignment·SET·VALUE·MODULE·Y5A013000
//
//·(-A114)
//
//·X3:·1·rotating·field·frequency
//·X3:·2·GND
//·X3:·3·//·SET·VALUE·0-10V
//·X3:·4·//·DIRECTION
//·X3:·5
//·X3:·6·+·24V
//·X3:·7·I·0.3·=·M·15.7·//·SERVO·READY·HA·(physical·axis·3)
//·X3:·8
//·X3:·9
//·X3:·10
//·X3:·11·Q·0.3·=·M·17.1·//·CONTROLLER·ENABLE·MAIN·DRIVE
//·X3:·12·Q·11.5
//·X3:·13·A·11.6
//·X3:·14
//·X3:·15·GND
//
//
//·3.·Input·and·output·assignment·on·REF·module·Y5A017000
//
//·(-A131)
//
//·X5:·1·I16.0·REF1·//·REF·switch·X-axis
//·X5:·2·I16.1·REF2·//·REF·switch·Y-axis
//·X5:·3·I16.2·REF3·//·REF·switch·Z-axis
//·X5:·4·I16.3·REF4·//·REF·BERO·A-ROUND·AXIS
//·X5:·5·I16.4·REF5·//·REF·BERO·WZW
//·X5:·6·I17.0·SYNC1·//·SYNC·BERO·X-axis
//·X5:·7·I17.1·SYNC2·//·SYNC·BERO·Y-axis
//·X5:·8·I17.2·SYNC3·//·SYNC·BERO·Z-axis
//·X5:·9·I17.5·SYNC4·//·SYNC·BERO·A-ROUND·AXIS
//·X5:·10·I17.4·SYNC5·//·SYNC·BERO·tool·axis
//·X5:·11·E·2.3·=·M·15.6;·//·only·TURN·!!·WHEEL·COVER·LIMIT·SWITCH·(IN·SERIES·WITH·
EMERGENCY·STOP!)
//·X6:·1·I·2.0·=·M·15.0·//·1st·door·limit·switch·MACHINE·DOOR·CLOSED·(MAIN·MOTOR·
CONTACTOR·ON)
//·Monitoring·whether·HA·contactors·have·dropped·out·(must·have·0·signal
//·be·with·the·door·or·wheel·cover·open·or·the·EMERGENCY·STOP·pressed)
//·X6:·2·I·2.1·=·M·15.1·//·1st·door·limit·switch·MACHINE·DOOR·OPEN
//·(0·signal·when·the·door·is·closed!)
//·X6:·3·I·2.2·=·M·15.2·//·EMERGENCY·OFF
//·X6:·4·I·2.4·=·M·16.0·//·n·=·0·RELAY·FROM·LENZE-FU
//·X6:·5·I·2.5·ON·24V·(only·ACC)·//·2nd·door·limit·switch·MACHINE·DOOR·CLOSED·2nd·door·
limit·switch
//·X6:·6·I·2.6·IN·24V
```

```
//·X6:·7·I·2.7·A·5V
//·X6:·8·I·3.0·A·5V
//·X6:·9·A·3.5·AUS·24V·(ACC·only)·//·ACTIVATE·RENISHAW·PROBE·WITH·12·INTERFACE
//·X6:·10·A·3.4·AUS·24V·(ACC·only)·//·OUTPUT·FOR·AUXILIARY·RELAY·DOOR·CLOSED
//·X6:·11·A·3.3·OFF·24V·//·COOLANT·(M8·=·ON·/·M9·=·OFF)
//
//
//·4.·Pin·assignment·on·INPUT·module·Y5A018000
//
//·(-A132)
//
//·X5:·1·I·4.0·//·TOOL·RETRACTED
//·X5:·2·I·4.1·//·TOOL·EXPRESSED
//·X5:·3·I·4.2·//·12mm·BERO·TOOL·EQUIPPED
//·X5:·4·I·4.3
//·X5:·5·I·4.4·//·DOOR·OPEN,·AUTOMATIC·DOOR
//·X5:·6·I·4.5·//·PRESSURE·SWITCH·VICE
//·X5:·7·I·4.6
//·X5:·8·E·4.7·SCHÄFER·dividing·attachment·finished
//·X5:·9·E·5.0·robotics·close·door
//·X5:·10·I·5.1·Open·the·robotics·door
//·X5:·11·E·5.2·Open·the·robotics·vice
//·X6:·1·I·5.3·Close·the·robotics·vice
//·X6:·2·I·5.4·Handwheel·clock·input·(in·MSD·file:·PLCHandWheelInput0·=·5.4)
//·X6:·3·I·5.5·Handwheel·direction·input
//·X6:·4·I·5.6·Start·the·robotics·program
//·X6:·5·I·5.7·Robotics·feed·stop
//·X6:·6·I·6.0·tool·infeed·above
//·X6:·7·I·6.1·Tool·infeed·below
//·X6:·8·I·6.2·STATUS·RENISHAW·PROBE·MI·12·INTERFACE
//·X6:·9·E·6.3·\·STATUS·RENISHAW·PROBE·MI·12·INTERFACE
//·X6:·10·I·6.4·NO·ERROR·RENISHAW·PROBE·MI·12·INTERFACE
//·X6:·11·E·6.5·LOW·BATT·RENISHAW·PROBE·MI·12·INTERFACE
//
//
//
//·5.·Pin·assignment·on·OUTPUT·module·Y5A019000
//
//·(-A134)
//
//·X5:·1·A·4.0·=·M·18.0·//·MINIMAL·LUBRICATION·(M7·=·ON·/·M9·=·OFF)
//·X5:·2·Q·4.1·=·M·18.1
//·X5:·3·A·4.2·=·M·18.2·//·BLOW-OUT·VALVE
//·X5:·4·A·4.3·=·M·18.3·//·DOOR·OPEN
//·X5:·5·A·4.4·=·M·18.4·//·DOOR·CLOSED
//·X5:·6·A·4.5·=·M·18.5·//·VICE·FORE
//·X5:·7·A·4.6·=·M·18.6·//·VICE·BACK
//·X5:·8·Q·4.7·=·M·18.7·//·PARTIAL·APPLIANCE·PART
//·X5:·9·Q·5.0·=·M·19.0·//·ROBOTIC·PROGRAM·STOP
(M30,·M0,·M1,·M2)
//·X5:·10·A·5.1·=·M·19.1·//·ROBOTIC·AXES·ARE·AT·REF.PKT.
//·X6:·1·Q·5.2·=·M·19.2
//·X6:·2·A·5.3·=·M·19.3·//·ROBOTIC·DOOR·OPEN
//·X6:·3·A·5.4·=·M·19.4·//·ROBOTIC·DOOR·CLOSED
//·X6:·4·A·5.5·=·M·19.5·//·ROBOTIC·REAR·VICE
//·X6:·5·A·5.6·=·M·19.6·//·ROBOTIC·VICE·CLAMPED
//·X6:·6·A·5.7·=·M·19.7·//·ROBOTIC·ALARM·OUTPUT
//·X6:·7·A·6.0·ACC·ONLY·//·TOOL·CLAMPING·MOTOR
//·X6:·8·A·6.1·ACC·ONLY·//·BLOW·OFF·THE·TOOL·CONE
//·X6:·9·A·6.2
//·X6:·10·Q·6.3
//
//
//·******************·Inputs·and·outputs·for·PCM·55·AC95·**********************.**
```

```
//·with·LENZE-FU·and·3-phase·stepper·motors
//
//·1st·input·assignment·on·the·AC·plug-in·board·Y4A091000·top-hat·rail·external·FU:
//·(Axiscontroller·Y4A·080·000·for·top·hat·rail)
//
//·X113.1·+·24V
//·X113.2·GND
//·X113.3·I·0.0·Reference·switch·axis·0·(X)
//
//·X115.1·+·24V
//·X115.2·GND
//·X115.3·I·0.1·Reference·switch·axis·1·(Y)
//
//·X117.1·+·24V
//·X117.2·GND
//·X117.3·I·0.2·Reference·switch·axis·2·(Z)
//
//·I·0.3·Reference·point·axis·3·(HA)
//
//·X114.3·+·24V·(X)·Bero
//·X114.3·GND·(X)·Bero
//·X114.3·I·0.4·Sync·axis·0·(X)·Bero
//
//·X116.3·+·24V·(Y)·Bero
//·X116.3·GND·(Y)·Bero
//·X116.3·I·0.5·Sync·axis·1·(Y)·Bero
//
//·X118.3·+·24V·(Z)·Bero
//·X118.3·GND·(Z)·Bero
//·X118.3·I·0.6·Sync·axis·2·(Z)·Bero
//
//·X109.1·+·5V
//·X109.2·GND
//·X109.3·free
//·X109.4·I·0.7
//·X109.5
//
//·A·3.7·Enable·differential·line·driver·clocks·for·SM
//·Ribbon·cable·connector·to·the·stepper·motor·board·16pol.·:
//·X104.1·I·1.0·//·I·0.0·=·M·15.3;·//·SERVO·READY·AXIS·0·(X)
//·X104.6·I·1.1·//·I·0.1·=·M·15.4;·//·SERVO·READY·AXIS·0·(Y)
//·X104.14·I·1.2·//·I·0.2·=·M·15.5;·//·SERVO·READY·AXIS·0·(Z)
//·X104.16·Servo·Enable·(via·X110.4·from·X121.3·=·Q·0.1)
//
//
//·X111.1·I·1.5·//·I·2.0·=·M·15.0·//·MACHINE·DOOR·CLOSED·(MAIN·MOTOR·CONTACTOR·ON)
//·Monitoring·whether·HA·contactors·have·dropped·out·(must·have·0·signal
//·be·with·the·door·or·wheel·cover·open·or·the·EMERGENCY·STOP·pressed)
//·X111.2·GND
//·X111.3·I·1.6·//·I·2.1·=·M·15.1·//·MACHINE·DOOR·OPEN
//·(0·signal·when·the·door·is·closed!)
//·X111.4·I·1.7·//·I·2.3·=·M·15.6;·//·WHEEL·COVER·LIMIT·SWITCH·(IN·SERIES·WITH·
EMERGENCY·STOP!)
//
//·X110.1·I·1.4·//·I·2.2·=·M·15.2·//·EMERGENCY·OFF
//·X110.2·GND
//·X110.3·I·2.0·reserve·input
//·X110.4·Servoenable·(signal·comes·from·X121.3·=·Q0.1).·This·entrance
//·is·via·the·16pol.·Ribbon·cable·connector·X104·Pin16·to·the
//·SM·card·and·releases·the·output·stages·there·(works
//·only·with·new·SM·card·Y4A031000).
//
//·X101.1·+·5V
//·X101.2·GND
```

```
//·X101.3·I·2.1
//
//·X102.1·+·5V
//·X102.2·GND
//·X102.3·I·2.2
//
//·X103.1·+·24V
//·X103.2·GND
//·X103.3·I·2.3·//·I·2.4·=·M·16.0·//·n·=·0·RELAY·FROM·LENZE-FU
//
//·X105.1·+·24V
//·X105.2·GND
//·X105.3·E·2.4·Renishaw·measuring·probe·(special·machine·for·USA,·input·only·for·NC)
//
//·E·2.5·Sync·X·(for·monitor·display·for·setting·the·reference·switch)
//·E·2.6·Sync·Y·(for·monitor·display·for·setting·the·reference·switch)
//·E·2.7·Sync·Z·(for·monitor·display·for·setting·the·reference·switch)
//
//·2nd·output·assignment·on·the·AC·connector·board·Y4A081000:
//
//·X1070.1·rotating·field·frequency·analog
//·X1070.2·GND
//·X1070.3·setpoint·analog
//·X1070.6·+·24V
//·X1070.7·I·1.3·//·I·0.3·=·M·15.7·//·SERVO·READY·HA
//
//·X107.2·Q·0.0·//·Q·0.3·=·M·17.1·//·CONTROLLER·ENABLE·MAIN·DRIVE
//·X107.6·RE·/·LI·(0/1)·Direction·of·rotation·of·the·main·drive
//·X107.7·GND
//
//·X121.1·+·24V
//·X121.2·GND
//·X121.3·Q·0.1·//·Q·3.0·=·M·17.0·//·ENABLE·AXES
//·(AC95:·is·connected·to·X110.4·-·enable
//·the·stepper·motor·output·stages)
//
//·X120.1·+·24V
//·X120.2·GND
//·X120.3·Q·0.2·reserve·output
//
//·X123.1·+·24V
//·X123.2·GND
//·X123.3·Q·0.3·reserve·output
//
//·X122.1·+·24V
//·X122.2·GND
//·X122.3·A·0.4·//·A·3.3·=·M·17.2·//·COOLANT·(M8·=·ON·/·M9·=·OFF)
//
//·3.·Input·/·output·assignment·on·the·CANBUS·I·/·O·board·Y4A029000:
//
//·input·byte·4,5
//·X201.1·E·4.0·8·******·ONLY·AC95·EL.VICE·"No·part·clamped"
//·X201.2·I·4.1·8·******·ONLY·AC95·EL.VICE·open
//·X201.3·E·4.2·8·******·ONLY·ACC·12mm-BERO·TOOL·EQUIPPED
//·X201.4·E·4.3
//·X201.5·E·4.4·//·DOOR·OPEN,·AUTOMATIC·DOOR
//·X201.6·I·4.5·8·******·ACC·/·AC95·EL.VICE·PART·CLAMPED·(signal·from·clamping·device·
board)
//·8·******·ACC·/·AC95·Pneum.·VICE·PRESS
K·SWITCH
//·X201.7·E·4.6
//·X201.8·E·4.7·SCHÄFER·dividing·attachment·finished
//·X201.9·+·24V·supply
//·X201.10·GND·supply
```

```
380   //
381   //
382   //·X301.1·E·5.0·robotics·close·door
383   //·X301.2·I·5.1·Open·the·robotics·door
384   //·X301.3·E·5.2·Open·the·robotics·vice
385   //·X301.4·E·5.3·Close·robotics·vice
386   //·X301.5·E·5.4·Robotics
387   //·X301.6·E·5.5·Robotics
388   //·X301.7·I·5.6·Start·the·robotics·program
389   //·X301.8·E·5.7·Robotics·feed·stop
390   //·X301.9·+·24V·supply
391   //·X301.10·GND·supply
392   //
393   //
394   //·output·byte·4.5
395   //·X501.1·Q·4.0·//·Q·4.0·=·M·18.0·MINIMAL·LUBRICATION
396   //·X501.2·Q·4.1·//·Q·4.1·=·M·18.1
397   //·X501.3·A·4.2·//·A·4.2·=·M·18.2·BLOW-OUT·VALVE
398   //·X501.4·A·4.3·//·A·4.3·=·M·18.3·DOOR·OPEN
399   //·X501.5·A·4.4·//·A·4.4·=·M·18.4·DOOR·CLOSED
400   //·X501.6·A·4.5·//·A·4.5·=·M·18.5·CLAMPING·THE·VICE
401   //·X501.7·Q·4.6·//·Q·4.6·=·M·18.6·RELEASE·THE·VICE
402   //·X501.8·Q·4.7·//·Q·4.7·=·M·18.7·PARTIAL·APPLIANCE·PART
403   //·X501.9·+·24V·supply
404   //·X501.10·GND·supply
405   //·X502.1·A·5.0·//·A·5.0·=·M·19.0·ROBOTIC·PROGRAM·STOP·(M30,·M0,·M1,·M2)
406   //·X502.2·A·5.1·//·A·5.1·=·M·19.1·ROBOTIC·AXES·ARE·AT·REF.PKT.
407   //·X502.3·Q·5.2·//·Q·5.2·=·M·19.2
408   //·X502.4·A·5.3·//·A·5.3·=·M·19.3·ROBOTIC·DOOR·OPEN
409   //·X502.5·A·5.4·//·A·5.4·=·M·19.4·ROBOTIC·DOOR·CLOSED
410   //·X502.6·A·5.5·//·A·5.5·=·M·19.5·ROBOTIC·REAR·VICE
411   //·X502.7·A·5.6·//·A·5.6·=·M·19.6·ROBOTIC·VICE·CLAMPED
412   //·X502.8·Q·5.7·//·Q·5.7·=·M·19.7·ROBOTIC·ALARM·OUTPUT
413   //·X502.9·+·24V·supply
414   //·X502.10·GND·supply
415   //
416   //
417   //
418   //·SET;·=·1
419   //·CLR;·=·0
420   //
421   //·TIMER:
422   //·SI·=·IMPULSE
423   //·THE·MAXIMUM·PULSE·LENGTH·CORRESPONDS·TO·THE·PROGRAMMED·TIME
424   //·THE·MINIMUM·PULSE·LENGTH·CORRESPONDS·TO·THE·LENGTH·OF·THE·INPUT·SIGNAL
425   //
426   //·SV·=·PULSE·(EXTENDED)
427   //·THE·PULSE·LENGTH·CORRESPONDS·TO·THE·PROGRAMMED·TIME
428   //·THE·DURATION·OF·THE·INPUT·SIGNAL·HAS·NO·INFLUENCE
429   //
430   //·SE·=·SWITCH-ON·DELAY
431   //·THE·DELAY·DURATION·CORRESPONDS·TO·THE·PROGRAMMED·TIME
432   //·THE·INPUT·SIGNAL·MUST·BE·PRESENT·FOR·AT·LEAST
433   //
434   //·SS·=·SWITCH-ON·DELAY·(STORING)
435   //·THE·DELAY·DURATION·CORRESPONDS·TO·THE·PROGRAMMED·TIME
436   //·THE·DURATION·OF·THE·INPUT·SIGNAL·HAS·NO·INFLUENCE
437   //
438   //·SA·=·SWITCH-OFF·PULSE
439   //·THE·PULSE·LENGTH·CORRESPONDS·TO·THE·PROGRAMMED·TIME
440   //·THE·TIMER·CHANGES·FROM·"0"·TO·"1"·AND·THE·TIME·IS·STARTED
441   //·IF·THE·INPUT·SIGNAL·GOES·FROM·"1"·TO·"0".
442   //
443   //·TIME·BASE·ASSIGNMENT·OF·THE·TIME·WORD
```

```
//·16·.....·8·7·.......·0
//·0.01·S·0000·0000·0000·0000
//·0.1·S·0001·0000·0000·0000
//·1·S·0010·0000·0000·0000
//·10·S·0011·0000·0000·0000
//·H·Z·E·=·TIME·VALUE·IN·BCD·FORMAT
//·00·=·BINARY·CODE·FOR·TIME·BASE
FUNCTION·FC·64:·VOID
NAME:·M0·RELEASE·ON·TXX·AND·CAMCONCEPT
BEGIN
U·DB20.DBX·182.0;·//·NEW·T-WORD
SPBN·M001;
L·DB20.DBW·184;·//·T-WORD
L·DB20.DBW·356;·//·ACTIVE·TOOL·IN·DB20
<>·I.
SPBN·M001;
S·M·12.0
M001:·NOP·0;
U·M·12.0
FP·M·12.1
U·M·12.1
SPBN·M002;
=·DB20.DBX·192.0;·//·M0·DYNAMIC
S·DB3.DBX·0.2;·//·Message·7002·change·tool
R·M·12.0
M002:·NOP·0;
O·DB1.DBX·1370.3;·//·RESET·KEY·PRESSED
O·DB1.DBX·1440.0;·//·RESET·TRIPPED
O·DB20.DBX·3.6;·//·NC·START·REQUEST
O·DB20.DBX·0.2;·//·FC·NC-START
R·DB3.DBX·0.2;·//·7002·change·tool
END_FUNCTION
FUNCTION·FC·65:·VOID
NAME:·TRIP·M0·and·move·up·the·Z-axis·with·TXX·and·Sinumeric·Operate
BEGIN
U·DB20.DBX·182.0;·//·NEW·T-WORD
SPBN·M6401;
L·DB20.DBW·184;·//·T-WORD
L·DB20.DBW·356;·//·ACTIVE·TOOL·IN·DB20
<>·I.
SPBN·M6401;
S·M·12.0·//·T-WORD·IS·VALID
M6401:·NOP·0;
NETWORK
TITLE·=·T-WORD·IS·VALID·SPINDLE·ENABLE·AND·AFG·/·EFG·switch·off
U·M·12.0·//·T-WORD·IS·VALID
=·M·94.7;·//·SPINDLE·ENABLE·T-WORD·IS·VALID
=·M·90.5;·//·AFG·/·EFG·T-WORD·IS·VALID
NETWORK
TITLE·=·CALCULATE·Z-AXIS·TOOL·CHANGE·POSITION
U·M·12.0·//·T-WORD·IS·VALID
FP·M·12.1·//·FP·T-WORD·IS·VALID
U·M·12.1·//·FP·T-WORD·IS·VALID
SPBN·M6402;
L·DB20.DBD·486·//·max.·Software·limit·switch·for·channel·axis·Z
L·+·5.0E-03;
-R
T·MD·28·//·Z-AXIS·TARGET·POSITION
M6402:·NOP·0;
NETWORK
TITLE·=·MOVE·Z-AXIS·TO·TOOL·CHANGE·POSITION
U·M·12.0·//·T-WORD·IS·VALID
CC·FC·60·//·Z-AXIS·TRAVEL·TO·TARGET·POSITION
U·M·22.3·//·Z-AXIS·IS·ON·TARGET·POSITION
```

```
S M 20.3 // RETURN TOOL DONE
R M 22.3 // Z-AXIS IS ON TARGET POSITION
NETWORK
TITLE = SPINDLE ENABLE AND AFG / EFG switch on
O DB3.DBX 0.2; // Message 7002 change tool
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 94.7; // SPINDLE ENABLE T-WORD IS VALID
R M 90.5; // AFG / EFG T-WLOCATION IS VALID
R M 20.3 // RETURN TOOL DONE
R M 12.0 // T-WORD IS VALID
R M 22.2 // Z-AXIS MOVE TO TARGET POSITION ACTIVE
NETWORK
TITLE = Trigger M0 and display message 7002 Change tool
U M 20.3 // RETURN TOOL DONE
SPBN M6403;
SET
= DB20.DBX 192.0; // M0 DYNAMIC
S DB3.DBX 0.2; // Message 7002 change tool
R M 20.3 // RETURN TOOL DONE
R M 12.0 // T-WORD IS VALID
M6403: NOP 0
NETWORK
TITLE = message 7002 Change tool after NC START delete
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
O DB20.DBX 3.6; // NC START REQUEST
O DB20.DBX 0.2; // FC NC-START
R DB3.DBX 0.2; // 7002 change tool
R M 12.0 // T-WORD IS VALID
END_FUNCTION
FUNCTION FC 66: VOID
NAME: HANDWHEEL
BEGIN
NETWORK
TITLE = functions for handwheel
O DB20.DBX 326.5; // BA INC1 from Kern
O DB20.DBX 326.6; // BA INC10 from Kern
O DB20.DBX 326.7; // BA INC100 from Kern
O DB20.DBX 327.0; // BA INC1000 from Kern
= M 98.6; // Handwheel BA
U (;
O (;
U M 98.6; // Handwheel BA
UN M 98.7; // HM handwheel active
);
O M 98.0; // Fl. Select INC1
O M 98.1; // Fl. Select INC10
O M 98.2; // Fl. Select INC100
O M 98.3; // Fl. Select INC1000
);
= DB1.DBX 1440.2; // Handwheel selection
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
ON M 98.6; // Handwheel BA
U M 98.7; // HM handwheel active
= DB1.DBX 1440.3; // handwheel deselection
U DB1.DBX 1440.2; // Handwheel selection
S M 98.7; // HM handwheel active
U DB1.DBX 1440.3; // handwheel deselection
R M 98.7; // HM handwheel active
// Include INC increment when changing BA
U DB20.DBX 326.5; // BA INC1 from Kern
FP M 98.0; // Fl. Select INC1
```

```
UN M 98.0;
SPB INC1;
L +1.0E-06;
T DB20.DBD 16; // INC increment
INC1: NOP 0;
U DB20.DBX 326.6; // BA INC10 from Kern
FP M 98.1; // Fl. Select INC10
UN M 98.1;
SPB INC2;
L +1.0E-05;
T DB20.DBD 16; // INC increment
INC2: NOP 0;
U DB20.DBX 326.7; // BA INC100 from Kern
FP M 98.2; // Fl. Select INC100
UN M 98.2;
SPB INC3;
L +1.0E-04;
T DB20.DBD 16; // INC increment
INC3: NOP 0;
U DB20.DBX 327.0; // BA INC1000 from Kern
FP M 98.3; // Fl. Select INC1000
UN M 98.3;
SPB INC4;
L +1.0E-03;
T DB20.DBD 16; // INC increment
INC4: NOP 0;
END_FUNCTION
FUNCTION FC 88: VOID
NAME: AUX_ON AC95 / AC88 CONVERSION TO ACC
BEGIN
NETWORK 1
TITLE = ENABLE DIFFERENTIAL LINE DRIVER ON ACC MOTHERBOARD
U M 110.3; // AUX-ON MANUAL
S A 3.7; // ENABLE DIFFERENTIAL LINE DRIVER CYCLES FOR SM
UN M 110.3; // AUX-ON MANUAL
L S5TIME # 1S; // 10X0.1S
SE T 10;
U T 10;
R A 3.7; // ENABLE DIFFERENTIAL LINE DRIVER CYCLES FOR SM
NETWORK 1
TITLE = ALARM NOT_AUS AC95 CONVERSION TO ACC
UN M 15.2; // EMERGENCY STOP SWITCH
S DB2.DBX 0.0; // ALARM EMERGENCY STOP
= DB1.DBX 1390.5; // PLC> SURF. EMERGENCY STOP SWITCH
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 0.0; // ALARM EMERGENCY STOP
NETWORK 2
TITLE = MESSAGE MACHINE DOOR OPEN AC95 CONVERSION TO ACC
U M 15.1; // MACHINE DOOR OPEN
UN DB3.DBX 6.2; // NO PART CLAMPED (M7050)
UN DB1.DBX 1370.0; // 1st PLC LOOP
UN DB3.DBX 2.7; // MESSAGE 7023 WAITING TIME MAIN DRIVE
UN DB3.DBX 0.2; // 7002 change tool
= DB3.DBX 5.0; // MACHINE DOOR OPEN (7040)
NETWORK 3
TITLE = 6024 ALARM DOOR OPEN AC95 CONVERSION TO ACC
O M 131.7; // AXES IN MOVEMENT
O M 92.0; // ROUND AXIS IN MOVEMENT
U DB20.DBX 326.4; // AUTO OPERATING MODE
= M 102.0; // HM
U M 131.7; // AXES IN MOVEMENT
U DB20.DBX 327.2; // REFERENCE OPERATING MODE
```

```
=·M·102.1;·//·HM
U·DB20.DBX·324.0;·//·PROGRAM·RUNNING
UN·DB20.DBX·324.1;·//·STOP·STATE
U·DB20.DBX·326.4;·//·AUTO·OPERATING·MODE
=·M·102.2;·//·HM
UN·M·114.3;·//·ACTUAL·SPEED·LESS·THAN·20RPM
=·M·102.3;·//·HM
O·M·102.0;·//·HM
O·M·102.1;·//·HM
O·M·102.2;·//·HM
O·M·102.3;·//·HM
=·M·110.2;·//·HM·DOOR·ALARM
U·M·110.2;·//·HM·DOOR·ALARM
U·M·15.1;·//·MACHINE·DOOR·OPEN
S·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
O·DB1.DBX·1370.2;·//·ACKNOWLEDGMENT·KEY·PRESSED
O·DB1.DBX·1370.3;·//·RESET·KEY·PRESSED
R·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
NETWORK·4
TITLE·=·SUM·ALARMS·1·AC95·CONVERSION·TO·ACC
L·DB2.DBW·0;·//·WORD·ALARMS·1
L·W·#·16·#·0;
<>·I;
=·M·105.0;·//·SUM·ALARMS1
NETWORK·5
TITLE·=·SUM·ALARMS·2·AC95·CONVERSION·TO·ACC
L·DB2.DBW·2;·//·WORD·ALARMS·2
L·W·#·16·#·0;
<>·I;
=·M·105.1;·//·SUM·ALARMS·2
NETWORK·6
TITLE·=·SUM·THERMAL·ALARMS·AC95·CONVERSION·TO·ACC
L·DB2.DBW·4;·//·BYTE·/·THERM.·ALARMS
L·W·#·16·#·0;
<>·I;
=·M·105.2;·//·SUM·THERM.·ALARMS
NETWORK·7
TITLE·=·SELECTION·AUX_ON·AC95·CONVERSION·TO·ACC
U·DB1.DBX·1370.0;·//·1st·PLC·LOOP
S·M·110.1;·//·AUX_ON·ON
U·M·110.1;·//·AUX_ON·ON
=·DB1.DBX·1390.2;·//·PLC>·SURFACE·AUX-ON
S·M·110.0;·//·AUX_ON·AUTO
S·M·110.3;·//·AUX-ON·MANUAL
NETWORK·8
TITLE·=·DESELECT·AUX_ON·AC95·CONVERSION·TO·ACC
O·M·105.0;·//·SUM·ALARMS·1
O·M·105.1;·//·SUM·ALARMS·2
O·M·105.2;·//·SUM·THERM.·ALARMS
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.3;·//·AUX-ON·MANUAL
UN·M·110.3;·//·AUX-ON·MANUAL
O·M·15.1;·//·MACHINE·DOOR·OPEN
O·M·18.3;·//·EXIT·FLAG·DOOR·OPEN
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.0;·//·AUX-ON·AUTO
NETWORK·9
TITLE·=·HW·CHECK·DOOR·OPEN·AC95·CONVERSION·TO·ACC·(ALARM·6009)
U·M·15.1;·//·MACHINE·DOOR·OPEN
L·S5TIME·#·1S;·//·10X0.1S
SE·T·6;·//·T6·SWITCH-ON·DELAYED
U·T·6;·//·T6
U·M·15.0;·//·MACHINE·DOOR·CLOSED·(MAIN·MOTOR·CONTACTOR·ON)
S·DB2.DBX·1.1;·//·HW·ERROR·SAFETY·CIRCUIT
```

```
NETWORK 10
TITLE = HW REVIEW CLOSE DOOR AC95 CONVERSION TO ACC
UN DB1.DBX 1370.0; // 1st PLC LOOP
UN M 15.1; // MACHINE DOOR OPEN
U M 15.2; // EMERGENCY STOP SWITCH
U M 15.6; // WHEEL COVER CLOSED
L S5TIME # 1S; // 10X0.1S
SE T 11; // T11 SWITCH-ON TV.
U T 11; // T11
UN M 15.0; // MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
S DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
END_FUNCTION
FUNCTION FC 41: VOID
NAME: RENISHAW PROBE
BEGIN
// X6: 9 A 3.5 // ACTIVATE RENISHAW PROBE MI 12 INTERFACE
// X6: 8 E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
// X6: 9 E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
// X6: 10 I 6.4 // NO ERROR RENISHAW PROBE MI 12 INTERFACE (24VDC IF NO ERROR)
// X6: 11 E 6.5 // LOW BATT RENISHAW PROBE MI 12 INTERFACE (24VDC IF BATTERY LOW)
NETWORK
TITLE = PROBE PRESENT
O E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
O E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
= M 11.0 // RENISHAW PROBE MI 12 INTERFACE AVAILABLE
NETWORK
TITLE = ACTIVATE RENISHAW PROBE MI 12 INTERFACE
U DB20.DBX 328.4 // MEASURE REQUIREMENTS
UN DB2.DBX 2.5; // (A6021) OPTICAL CONNECTION INTERRUPTED
U E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
UN E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
O M 11.4 // HM RENISHAW PROBE MI 12 SWITCH OFF INTERFACE
O M 11.5 // CANCEL FLAG RESET KEY PRESSED
L S5TIME # 200MS; // 200MS
SV T 16; // LONGER PULSE
U T 16; // LONGER PULSE
= A 3.5 // ACTIVATE RENISHAW PROBE MI 12 INTERFACE
UN T 16; // LONGER PULSE
; R T 17;
R M 11.4 // HM RENISHAW SWITCH OFF PROBE MI 12 INTERFACE
U A 3.5 // ACTIVATE RENISHAW PROBE MI 12 INTERFACE
U DB20.DBX 328.4 // MEASURE REQUIREMENTS
S M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
U M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
UN E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
U E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
U E 6.4 // NO ERROR RENISHAW PROBE MI 12 INTERFACE
R M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
S M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
NETWORK
TITLE = ACC RELEASE MEASURE
U M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
S DB20.DBX 343.7 // ACC RELEASE MEASURE
NETWORK
TITLE = END MEASUREMENT
U M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
U E 6.4 // NO ERROR RENISHAW PROBE MI 12 INTERFACE
U E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
UN E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
R M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
R T 17;
```

```
S M 11.3 // RENISHAW MEASUREMENT COMPLETED WITHOUT ERRORS
UN DB20.DBX 328.4 // MEASURE REQUIREMENT
U M 11.3 // RENISHAW MEASUREMENT COMPLETED WITHOUT ERRORS
ON M 11.0 // RENISHAW PROBE MI 12 INTERFACE AVAILABLE
R DB20.DBX 343.7 // ACC RELEASE MEASURE
R M 11.3 // RENISHAW MEASUREMENT COMPLETED WITHOUT ERRORS
S M 11.4 // HM RENISHAW PROBE MI 12 SWITCH OFF INTERFACE
UN E 6.2 // STATUS RENISHAW PROBE MI 12 INTERFACE
U E 6.3 // \ STATUS RENISHAW PROBE MI 12 INTERFACE
U E 6.4 // NO ERROR RENISHAW PROBE MI 12 INTERFACE
UN M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
UN DB1.DBX 1370.3; // RESET KEY PRESSED
FP M 11.5 // CANCEL FLAG RESET KEY PRESSED
NETWORK
TITLE = CANCEL MEASUREMENT
O M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
O M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
O M 11.3 // RENISHAW MEASUREMENT COMPLETED WITHOUT ERRORS
U DB1.DBX 1370.3; // RESET KEY PRESSED
R M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
R M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
R M 11.3 // RENISHAW MEASUREMENT COMPLETED WITHOUT ERRORS
R DB20.DBX 343.7 // ACC RELEASE MEASURE
S M 11.4 // HM RENISHAW PROBE MI 12 SWITCH OFF INTERFACE
R T 17;
NETWORK
TITLE = (A6021) OPTICAL LINK LOSSED
; U M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
U M 11.1 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED
L S5TIME # 100S; // 200M SECONDS
SS T 17;
U T 17;
UN E 6.4 // NO ERROR RENISHAW PROBE MI 12 INTERFACE
S DB2.DBX 2.5; // (A6021) OPTICAL CONNECTION INTERRUPTED
R M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
R T 17;
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 2.5; // (A6021) OPTICAL CONNECTION INTERRUPTED
NETWORK
TITLE = 7044 PROBE BATTERY LOW
U M 11.2 // RENISHAW PROBE MI 12 INTERFACE ACTIVATED AND READY
U E 6.5 // LOW BATT RENISHAW PROBE MI 12 INTERFACE
S DB3.DBX 5.4; // 7044 PROBE BATTERY LOW
U DB1.DBX 1370.3; // RESET KEY PRESSED
R DB3.DBX 5.4; // 7044 PROBE BATTERY LOW
END_FUNCTION
FUNCTION FC 49: VOID
NAME: ENTER TOOL POSITIONS IN MILL55_ACC.MSD
BEGIN
// CTR 1 DB20.DBX 294.5 ACCEPT POSITION FOR TOOL 1
// CTR 2 DB20.DBX 294.6 ACCEPT POSITION FOR TOOL 2
// CTR 3 DB20.DBX 294.1 ACCEPT POSITION FOR TOOL 3
// CTR 4 DB20.DBX 295.1 ACCEPT POSITION FOR TOOL 4
// CTR 5 DB20.DBX 295.2 ACCEPT POSITION FOR TOOL 5
// CTR 6 DB20.DBX 295.3 ACCEPT POSITION FOR TOOL 6
// CTR 7 DB20.DBX 295.4 ACCEPT POSITION FOR TOOL 7
// CTR 8 DB1.DBX 1374.4 ACCEPT POSITION FOR TOOL 8
// CTR ß DB1.DBX 1374.3 POSITION FOR Z-AXIS T1-T8 ADOPT EXPRESSION AND RECOVERY POSITION
NETWORK
TITLE = APPLY POSITION FOR TOOL 1
U DB20.DBX 294.5 // "CTR 1" KEY ADOPT POSITION FOR TOOL 1
SPBN M001;
L 1 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
```

```
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
T DB10.DBD 32 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M001: NOP 0;
NETWORK
TITLE = APPLY POSITION FOR TOOL 2
U DB20.DBX 294.6 // "CTR 2" KEY ADOPT POSITION FOR TOOL 2
SPBN M002;
L 2 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
T DB10.DBD 36 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M002: NOP 0;
NETWORK
TITLE = ACCEPT POSITION FOR TOOL 3
U DB20.DBX 294.1 // "CTR 3" KEY ADOPT POSITION FOR TOOL 3
SPBN M003;
L 3 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
T DB10.DBD 40 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M003: NOP 0;
NETWORK
TITLE = ADOPT POSITION FOR TOOL 4
U DB20.DBX 295.1 // "CTR 4" KEY ADOPT POSITION FOR TOOL 4
SPBN M004;
L 4 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
T DB10.DBD 44 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M004: NOP 0;
NETWORK
TITLE = APPLY POSITION FOR TOOL 5
U DB20.DBX 295.2 // "CTR 5" KEY ADOPT POSITION FOR TOOL 5
SPBN M005;
L 5 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
T DB10.DBD 48 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M005: NOP 0;
NETWORK
TITLE = APPLY POSITION FOR TOOL 6
U DB20.DBX 295.3
// "CTR 6" KEY ADOPT POSITION FOR TOOL 6
SPBN M006;
L 6 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L +1.0E+03; // MULTIPLE BY 1000
*R;
```

```
T DB10.DBD 52 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M006: NOP 0;
NETWORK
TITLE = APPLY POSITION FOR TOOL 7
U DB20.DBX 295.4 // "CTR 7" KEY ADOPT POSITION FOR TOOL 7
SPBN M007;
L 7 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L + 1.0E + 03; // MULTIPLE BY 1000
* R;
T DB10.DBD 56 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M007: NOP 0;
NETWORK
TITLE = ACCEPT POSITION FOR TOOL 8
U DB1.DBX 1374.4 // "CTR 8" KEY ADOPT POSITION FOR TOOL 8
SPBN M008;
L 8 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 16 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 4
L + 1.0E + 03; // MULTIPLE BY 1000
* R;
T DB10.DBD 60 // WRITE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M008: NOP 0;
NETWORK
TITLE = POSITION FOR Z-AXIS T1-T8 EXPRESSION AND ADOPT INPUT POSITION
U DB1.DBX 1374.3 // Z-AXIS T1-T8 EXPRESSION AND INPUT POSITION
SPBN M009;
L 14 // SWIVELED TOOL
T DB20.DBW 356 // TRANSFER CURRENT TOOL NUMBER
L DB1.DBD 8 // LOAD THE ACTUAL POSITION FROM ABSOLUTE AXIS 2
T DB10.DBD 84 // WRITE THE ACTUAL POSITION INTO THE MSD DATA
S DB20.DBX 4.2 // COMMAND-BIT 2
M009: NOP 0;
END_FUNCTION
FUNCTION FC 50: VOID
NAME: TOOL TURNERS
BEGIN
; MD 28 Z-AXIS TARGET POSITION
; MD 32 A-AXIS POSITION FOR CLAMPED TOOL
; MD 36 NEW A-AXIS POSITION
; MW 40 NEW TOOL FROM VALID T-WORD
; MW 42 CLAMPED TOOL FROM THE SETTING DATA
; MW 44 RESULTS OF TOOL HOLDER INSPECTION (TOOL HOLDER FREE)
; MW 46 TOOL EQUIPMENT (RESULTS WHEN EXTENDING THE TOOL DISC FROM 12mm BERO)
; MD 64 Z-AXIS T1-T8 EXPRESSION AND INPUT POSITION
; MD 74 Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
; MD 78 Z-AXIS 1MM UNDER SW LIMIT SWITCH
; L DB10.DBD 80; // Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
; L DB10.DBD 88; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
; L DB10.DBD 92; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
NETWORK
TITLE = CALCULATING THE Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
L DB10.DBD 84; // Z-AXIS TOOL GRIPPER POSITION FOR T1
L + 5.0E-03;
-R
T MD 64; // Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
NETWORK
TITLE = CALCULATING THE Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
L DB10.DBD 84; // Z-AXIS TOOL GRIPPER POSITION FOR T1
L + 7.5E-02; // 75 MM
```

```
+ R
T MD 74; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
NETWORK
TITLE = CALCULATE THE Z-AXIS 1MM UNDER THE SW LIMIT SWITCH
L DB10.DBD 84; // Z-AXIS TOOL GRIPPER POSITION FOR T1
L + 1.4E-01; // 140 MM
+ R
T MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
; M 27.0 TOOL RETRACTED
; M 27.1 TOOL EXPRESSED
; M 53.0 M70 EXPRESS TOOL
; PULL IN THE M 53.1 M72 TOOL
; DB15.DBW 25 (IN BITS FROM 0 TO 8) CLAMPED TOOL IN THE SETTING DATA
NETWORK
TITLE = SET ABORT FLAG FROM THE SETTING DATA
U DB1.DBX 1370.0; // 1st PLC LOOP
U DB15.DBX 20.0 // SAVE TOOL ABORTED IN THE SETTING DATA
S M 52.3 // TOOL CANCELED
NETWORK
TITLE = WZW AFG / EFG and NC_START VERR.
L DB1.DBD 16 // ABSOLUTE AXIS 4 ACTUAL POSITION
L + 0.00E-00;
== R
= M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
UN M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
U DB1.DBX 134.4; // REFERENCE POINT TOOL AXIS ACTIVE
UN DB10.DBX 100.0 // SET TOOL MILL55 ENABLED
= M 90.2; // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED AFG / EFG
= M 96.0; // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED NC_START LOCK.
NETWORK
TITLE = TOOL ENABLE
U M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
U M 120.2 // TOOL AXIS 0 DEGREES REACHED
O M 25.0 // TOOL 0 PICK UP DONE
O DB10.DBX 100.0 // SET TOOL MILL55 ACTIVATED
UN M 94.0; // AUX-ON SFG
U M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
UN M 52.0; // TOOL TURNING ACTIVE
UN M 52.3 // TOOL ABORTED
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
UN DB3.DBX 7.0; // MESSAGE 7056 ILLEGAL TOOL NUMBER IN THE SETTING DATA
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
U DB25.DBX 340.4; // AXLE ENABLE K1
U DB25.DBX 340.3; // READ RELEASE
K1
= M 27.5; // TOOL ENABLE
FP M 52.1 // FM TOOL ENABLE
UN M 27.5; // TOOL ENABLE
= M 96.1 // NC_START VERR.
U M 52.1 // FM TOOL ENABLE
R M 94.7; // SPINDLE ENABLE T-WORD IS VALID
R M 90.5; // AXLE RELEASE T-WORD IS VALID
NETWORK
TITLE = SET TOOL POSITION FROM THE SETTING DATA
O(
U M 27.5; // TOOL ENABLE
U DB20.DBX 182.0 // NEW T-WORD (TOOL)
)
O DB1.DBX 1370.0; // 1st PLC LOOP
CC FC 52; // SET TOOL POSITION FROM THE SETTING DATA
NETWORK
CLEAR TITLE = MESSAGE "7000 WRONG T-WORD"
U DB1.DBX 1370.3; // RESET KEY PRESSED
```

```
R DB3.DBX 0.0; // 7000 WRONG T-WORD
NETWORK
TITLE = CHECK NEW T-WORD
U M 27.5; // TOOL ENABLE
U DB20.DBX 182.0 // NEW T-WORD (TOOL)
UN M 20.2 // ILLEGAL TOOL NUMBER IN THE SETTING DATA
CC FC 53; // CHECK NEW T-WORD AND DETERMINE NEW TOOL DISC POSITION
NETWORK
TITLE = T-WORD IS VALID AND STOP THE MAIN SPINDLE
U M 27.5; // TOOL ENABLE
U DB20.DBX 182.0 // NEW T-WORD (TOOL)
U M 22.6 // T-WORD DOES NOT EQUAL TOOLS
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
S M 94.7; // SPINDLE ENABLE T-WORD IS VALID
S M 90.5; // AFG / EFG T-WORD IS VALID
S M 20.6; // T-WORD IS VALID
R M 22.7 // NEW T-WORD SAVED FOR MESSAGE 7001
NETWORK
TITLE = "7055 OPEN TOOL CLAMPING SYSTEM" AND DELETE "7057 TOOL HOLDER OCCUPIED"
U M 27.1 // TOOL EXPRESSED
R DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
NETWORK
TITLE = START TOOL TURNING WHEN THE HS SPEED IS LESS 20 RPM
U M 20.6; // T-WORD IS VALID
U M 114.3; // HA ACTUAL SPEED LESS THAN 20RPM
S M 20.7; // TOOL TURNERS START FROM VALID T-WORD
R M 20.6; // T-WORD IS VALID
NETWORK
TITLE = CANCEL TURNING TOOL IF PROCESS NOT YET STARTED
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET RELEASED
U M 20.6; // T-WORD IS VALID
UN M 20.7; // TOOL TURNERS START FROM VALID T-WORD
R M 94.7; // SPINDLE ENABLE T-WORD IS VALID
R M 90.5; // AFG / EFG T-WORD IS VALID
R M 20.6; // T-WORD IS VALID
NETWORK
TITLE = CLEAR TOOL CONE CANCEL
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET RELEASED
O DB1.DBX 1366.3; // ALARM ACTIVE
O DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
R A 6.1 // BLOW OFF THE TOOL CONE
NETWORK
TITLE = TOOL TURNING STARTED SAVE IN THE SETTING DATA
U M 20.7; // TOOL TURNERS START FROM VALID T-WORD
FP M 52.4
U M 52.4
S DB15.DBX 20.0 // SAVE TOOL ABORTED IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
NETWORK
TITLE = X / Y - - AXIS MOVE OUT WITH ACTIVATED ROUND AXIS
U M 52.7 // ROUND AXIS ACTIVATED
SPBN M111;
NETWORK
TITLE = X / Y - - SAVE AXIS ACTUAL POSITION
U M 20.7; // TOOL TURNERS START FROM VALID T-WORD
UN M 23.7 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
UN M 23.5 // HM Y-AXIS MOVE TO TARGET POSITION ACTIVE
SPBN M002;
L DB1.DBD 4 // Actual position for axis 1 (Y)
T MD 56 // Actual position for axis 1 (Y)
L DB1.DBD 0 // Actual position for axis 1 (X)
T MD 60 // Actual position for axis 1 (X)
```

```
M002: NOP 0;
NETWORK
TITLE = X / Y - - MOVE AXIS TO SOFTWARE END SWITCH
U M 20.7; // TOOL TURNERS START FROM VALID T-WORD
UN M 23.7 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
UN M 23.5 // HM Y-AXIS MOVE TO TARGET POSITION ACTIVE
SPBN M003;
S M 23.7 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
; S DB25.DBX 340.3; // READ-IN ENABLE K1
; S DB25.DBX 340.4; // AXLE ENABLE K1
= DB25.DBX 1.4; // SEND NC BLOCK
= DB25.DBX 548.7 // G0 is triggered
= DB25.DBX 548.5; // SET EXACT HOLD MODE
= DB25.DBX 20.0; // POSITION REQUEST FOR X-AXIS
= DB25.DBX 20.1; // POSITION REQUEST FOR Y-AXIS
L DB20.DBD 482 // MAX. SW LIMIT SWITCH FOR Y-AXIS FLOAT VALUE IN M
T DB25.DBD 26; // POSITION VALUE FOR Y-AXIS
L DB20.DBD 414 // MIN. SW LIMIT SWITCH FOR X-AXIS FLOAT VALUE IN M
T DB25.DBD 22; // POSITION VALUE FOR X-AXIS
M003: NOP 0;
U DB25.DBX 332.0; // NC BLOCK DONE
U M 20.7; // TOOL TURNERS STARTED FROM VALID T-WORD
S M 23.5 // HM Y-AXIS MOVE TO TARGET POSITION ACTIVE
R M 23.7 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
NETWORK
TITLE = X / Y - - MOVE AXIS TO LISTED POSITION
U M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
U M 21.5 // STEP 5
U M 20.7; // TOOL TURNERS STARTED FROM VALID T-WORD
UN M 21.6 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
SPBN M004;
S M 21.6 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
; S DB25.DBX
340.3; // READ-IN ENABLE K1
; S DB25.DBX 340.4; // AXLE ENABLE K1
= DB25.DBX 1.4; // SEND NC BLOCK
= DB25.DBX 548.7 // G0 is triggered
= DB25.DBX 548.5; // SET EXACT HOLD MODE
= DB25.DBX 20.0; // POSITION REQUEST FOR X-AXIS
= DB25.DBX 20.1; // POSITION REQUEST FOR Y-AXIS
L MD 56 // Actual position for axis 1 (Y)
T DB25.DBD 26; // POSITION VALUE FOR Y-AXIS
L MD 60 // Actual position for axis 1 (X)
T DB25.DBD 22; // POSITION VALUE FOR X-AXIS
M004: NOP 0;
U DB25.DBX 332.0; // NC BLOCK DONE
U M 20.7; // TOOL TURNERS STARTED FROM VALID T-WORD
U M 21.6 // Y-AXIS MOVE TO TARGET POSITION ACTIVE
S M 26.2; // HM X / Y-AXIS TARGET POSITION REACHED
U M 26.2; // HM X / Y-AXIS TARGET POSITION REACHED
L S5TIME # 500MS;
SE T 15; // T15 SWITCH-ON DELAYED
U T 15; // T15 SWITCH-ON DELAYED
S M 20.4 // PICK UP TOOL DONE
R M 26.2; // HM X / Y-AXIS TARGET POSITION REACHED
M111: NOP 0;
NETWORK
TITLE = RETURN TOOL
U M 20.7; // TOOL TURNERS STARTED FROM VALID T-WORD
UN M 20.3 // RETURN TOOL DONE
SPBN M005;
U M 42.1 // TOOL 1 CLAMPED
CC FC 54 // RETURN TOOL 1
SPB M005;
```

```
O M 20.1 // TOOL EXPRESSED AND NO TOOL NUMBER STORED
O M 42.0 // TOOL 0 CLAMPED
CC FC 55 // RETURN TOOL 0 OR NO TOOL
SPB M005;
CALL FC 56 // RETURN TOOLS 2 TO 8
M005: NOP 0;
NETWORK
TITLE = PICK UP NEW TOOL
U M 20.7; // TOOL TURNERS STARTED FROM VALID T-WORD
U M 20.3 // RETURN TOOL DONE
UN M 20.4 // PICK UP TOOL DONE
SPBN M006;
U M 40.1 // TOOL 1 SELECTED
CC FC 57 // PICK UP TOOL 1
SPB M006;
U M 40.0 // TOOL 0 SELECTED
CC FC 58 // PICK UP TOOL 0
SPB M006;
CALL FC 59 // PICK UP TOOLS 2 TO 8
M006: NOP 0;
NETWORK
TITLE = END TOOL TURNING
U M 20.4 // PICK UP TOOL DONE
O M 26.1 // NEW T-WORD IS TOOLS
SPBN M007;
L DB20.DBW 184; // LOAD T-WORD
T DB20.DBW 356; // ACTIVE TOOL IN DB20
L 0
T MD 20
R DB15.DBX 20.0 // SAVE TOOL ABORTED IN THE SETTING DATA
L MW 40 // MW 40
T DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
R M 90.5; // AFG / EFG T-WORD IS VALID
R M 94.7; // SPINDLE ENABLE T-WORD IS VALID
M007: NOP 0;
NETWORK
TITLE = TOOL TURNING ACTIVE
L MB 20; // STEP CHAIN
L 0;
<> I;
= M 52.0; // TOOL TURNING ACTIVE
NETWORK
TITLE = CANCEL TOOL TURNING
U M 52.0; // TOOL TURNING ACTIVE
U (
ON A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
O DB2.DBX 0.0; // ALARM EMERGENCY STOP
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
)
O(
U E 16.4 // REF BERO WZW
U DB1.DBX 1370.0; // 1st PLC LOOP
)
O(
U E 16.4 // REF BERO WZW
U M 120.5 // FM OUTPUT FOR AUXILIARY RELAY DOOR CLOSED
)
SPBN M001;
L 0
T MD 20 // TOOL STEP MARKER
S M 52.3 // TOOL CANCELED
R M 94.7; // SPINDLE ENABLE T-WORD IS VALID
```

```
R M 90.5; // AFG / EFG T-WORD IS VALID
R M 26.2; // HM X / Y-AXIS TARGET POSITION REACHED
M001: NOP 0;
NETWORK
TITLE = MELDUNG 7058 AXES RELEASE
U E 16.4 // REF BERO WZW
U M 120.5 // FM OUTPUT FOR AUXILIARY RELAY DOOR CLOSED
O(
ON M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
O E 16.4 // REF BERO WZW
U M 52.3 // TOOL ABORTED
)
O(;
U M 25.0 // TOOL 0 DONE DONE
UN DB10.DBX 75.2; // RETRACT IN THE DISC AT T0 TOOL
);
FP M 25.1
U M 25.1
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
SPBN M008;
S DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
S DB15.DBX 20.0 // SAVE TOOL ABORTED IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
= DB1.DBX 1440.0; // TRIGGER NC RESET
M008: NOP 0;
NETWORK
TITLE = MESSAGE 7058 DELETE AXES FREE MOVEMENT
U I 16.2 // REF Z-axis switch (0-SIGNAL IF AXIS UP !!!!)
FN M 25.3
U DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
U M 25.3
SPBN M2008;
= DB1.DBX 1440.0; // RESET TRIPPED
M2008: NOP 0;
UN I 16.2 // REF Z-axis switch (0-SIGNAL IF AXIS UP !!!!)
U M 120.5 // FM OUTPUT FOR AUXILIARY RELAY DOOR CLOSED
; ON I 16.4 // REF BERO WZW
O DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
FP M 25.2
U M 52.3 // TOOL ABORTED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
O M 25.2
O M 25.3
ON I 16.4 // REF BERO WZW
SPBN M009;
R M 52.3
// TOOL CANCELED
R DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
R DB15.DBX 20.0 // SAVE TOOL ABORTED IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
M009: NOP 0;
END_FUNCTION
FUNCTION FC 54: VOID
NAME: RETURN TOOL 1
BEGIN
NETWORK
TITLE = CHECK THAT TOOL HOLDER 1 IS FREE
L DB1.DBD 16
L + 0.70E-02;
<R;
U E 4.2; // 12mm BERO TOOL EQUIPPED
; S M 46.1 // TOOL 1 PRESENT
S DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
= DB1.DBX 1440.0; // TRIGGER NC RESET
```

```
BEB
NETWORK
TITLE = STEP 0 Z-AXIS TOOL GRIPPER POSITION FOR T1
UN M 23.0 // STEP 0
SPBN M001;
L DB10.DBD 84; // Z-AXIS TOOL GRIPPER POSITION FOR T1
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.0 // STEP 0
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M001: NOP 0;
NETWORK
TITLE = STEP 1 MOVE TOOL DISC TO RETURN POSITION
U M 23.0 // STEP 0
UN M 23.1 // STEP 1
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
SPBN M002;
S M 21.7 // HM TOOL TURNING DISC MOVE WITH 20% RAPID SPEED
S M 20.5 // CHECK THAT THE TOOL AREA IS FREE
L MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 20.5 // CHECK THAT THE TOOL AREA IS FREE
R M 22.1 // TOOL DISC VALID POSITION REACHED
R M 21.7 // HM TOOL TURNER DISC MOVE WITH 20% RAPID SPEED
S M 23.1 // STEP 1
M002: NOP 0;
NETWORK
TITLE = STEP 2 PRINT TOOL
U M 23.1 // STEP 1
UN M 23.2 // STEP 2
UN M 27.1 // TOOL EXPRESSED
S M 53.0 // M70 EXPRESS TOOL
U M 23.1 // STEP 1
UN M 23.2 // STEP 2
U M 27.1 // TOOL EXPRESSED
S M 23.2 // STEP 2
NETWORK
TITLE = Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
U M 23.2 // STEP 2
UN M 23.3 // STEP 3
SPBN M004;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
U M 40.0 // TOOL 0 SELECTED
SPB M104;
L MD 74; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
M104: NOP 0;
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.3 // STEP 3
S M 20.3 // RETURN TOOL DONE
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M004: NOP 0;
END_FUNCTION
FUNCTION FC 57: VOID
NAME: PICK UP TOOL 1
BEGIN
NETWORK
TITLE = STEP 0 TOOL DISC ON NEW A-AXIS POSITION
UN M 21.0 // STEP 0
SPBN M001;
```

```
L MD 36 // NEW A-AXIS POSITION
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 21.0 // STEP 0
M001: NOP 0;
NETWORK
TITLE = STEP 2 Z-AXIS TO T1-T8 EXPRESSION AND MOVE INTO THE INPUT POSITION
U M 21.0 // STEP 0
UN M 21.1 // STEP 1
SPBN M002;
S A 6.1 // BLOW OFF THE TOOL CONE
L MD 64; // Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 21.1 // STEP 1
R M 22.3 // Z-AXIS IS ON TARGET POSITION
R A 6.1 // BLOW OFF THE TOOL CONE
M002: NOP 0;
NETWORK
TITLE = STEP 3 PULL IN TOOL
UN M 21.2 // STEP 2
U M 21.1 // STEP 1
UN M 27.0 // TOOL RETRACTED
S M 53.1 // M72 PULL IN TOOL
UN M 21.2 // STEP 2
U M 21.1 // STEP 1
U M 27.0 // TOOL DRAWN IN
S M 21.2 // STEP 2
NETWORK
TITLE = STEP 4 Z-AXIS TOOL GRIPPER POSITION FOR T1
U M 21.2 // STEP 2
UN M 21.3 // STEP 3
SPBN M003;
L DB10.DBD 84; // Z-AXIS TOOL GRIPPER POSITION FOR T1
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 21.3 // STEP 3
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M003: NOP 0;
NETWORK
TITLE = STEP 5 TOOL DISC MOVE TO 0 - POSITION
U M 21.3 // STEP 3
UN M 21.4 // STEP 4
SPBN M004;
S M 21.7 // HM TOOL TURNING DISC MOVE WITH 20% RAPID SPEED
L 0 // A-AXIS POSITION 0 DEGREES
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
R M 21.7 // HM TOOL TURNER DISC MOVE WITH 20% RAPID SPEED
S M 21.4 // STEP 4
U M 21.4 // STEP 4
UN M 52.7 // ROUND AXLE ACTIVATED
S M 20.4 // PICK UP TOOL DONE
M004: NOP 0;
NETWORK
TITLE = STEP 6 Z-AXIS 1MM UNDER THE SW LIMIT SWITCH
U M 21.4 // STEP 4
UN M 21.5 // STEP 5
```

```
U M 52.7 // ROUND AXIS ACTIVATED
SPBN M005;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 21.5 // STEP 5
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M005: NOP 0;
END_FUNCTION
FUNCTION FC 59: VOID
NAME: PICK UP TOOLS 2 TO 8
BEGIN
NETWORK
TITLE = STEP 0 TOOL DISC ON NEW A-AXIS POSITION
UN M 21.0 // STEP 0
SPBN M001;
L MD 36 // NEW A-AXIS POSITION
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 21.0 // STEP 0
M001: NOP 0;
NETWORK
TITLE = STEP 2 Z-AXIS TO T1-T8 EXPRESSION AND MOVE INTO THE INPUT POSITION
U M 21.0 // STEP 0
UN M 21.1 // STEP 1
SPBN M002;
S A 6.1 // BLOW OFF THE TOOL CONE
L MD 64; // Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 21.1 // STEP 1
R M 22.3 // Z-AXIS IS ON TARGET POSITION
R A 6.1 // BLOW OFF THE TOOL CONE
M002: NOP 0;
NETWORK
TITLE = STEP 3 PULL IN TOOL
UN M 21.2 // STEP 2
U M 21.1 // STEP 1
UN M 27.0 // TOOL RETRACTED
S M 53.1 // M72 PULL IN TOOL
UN M 21.2 // STEP 2
U M 21.1 // STEP 1
U M 27.0 // TOOL DRAWN IN
S M 21.2 // STEP 2
NETWORK
TITLE = STEP 4 Z-AXIS 1MM UNDER THE SW LIMIT SWITCH
U M 21.2 // STEP 2
UN M 21.3 // STEP 3
SPBN M003;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 21.3 // STEP 3
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M003: NOP 0;
NETWORK
TITLE = STEP 5 TOOL DISC MOVE TO 0 - - POSITION
U M 21.3 // STEP 3
UN M 21.5 // STEP 5
```

```
SPBN M004;
L 0 // A-AXIS POSITION 0 DEGREES
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 21.5 // STEP 5
U M 21.5 // STEP 5
UN M 52.7 // ROUND AXLE ACTIVATED
S M 20.4 // PICK UP TOOL DONE
M004: NOP 0;
END_FUNCTION
FUNCTION FC 55: VOID
NAME: TOOL 0 OR NO TOOL RETURNED
BEGIN
NETWORK
TITLE = OPEN TOOL CLAMPING DEVICE TO PICK UP A TOOL
UN M 23.0 // STEP 0
UN M 27.1 // TOOL EXPRESSED
S M 53.0 // M70 EXPRESS TOOL
UN M 23.0 // STEP 0
U M 27.1 // TOOL EXPRESSED
S M 23.0 // STEP 0
NETWORK
TITLE = MOVE Z-AXIS TO TARGET POSITION
UN M 23.1 // STEP 1
SPBN M001;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
;; L DB10.DBD 88; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.1 // STEP 1
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M001: NOP 0;
U M 23.0 // STEP 0
U M 23.1 // STEP 1
S M 20.3 // RETURN TOOL DONE
END_FUNCTION
FUNCTION FC 56: VOID
NAME: RETURN TOOLS 2 THROUGH 8
BEGIN
NETWORK
TITLE = STEP 0 Z-AXIS 1MM UNDER THE SW LIMIT SWITCH
UN M 23.0 // STEP 0
SPBN M001;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.0 // STEP 0
M001: NOP 0;
NETWORK
TITLE = STEP 1 MOVE TOOL DISC TO RETURN POSITION
U M 23.0 // STEP 0
UN M 23.1 // STEP 1
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
SPBN M002;
S M 20.5 // CHECK THAT THE TOOL AREA IS FREE
L MD 32
// A-AXIS POSITION FOR CLAMPED TOOL
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
```

```
R M 20.5 // CHECK THAT THE TOOL AREA IS FREE
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 23.1 // STEP 1
M002: NOP 0;
NETWORK
TITLE = STEP 2 Z-AXIS TO T1-T8 EXPRESSION AND MOVE INTO THE INPUT POSITION
U M 23.1 // STEP 1
UN M 23.2 // STEP 2
SPBN M003;
L MD 64; // Z-AXIS T1-T8 EXPRESSION AND INSERTION POSITION
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.2 // STEP 2
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M003: NOP 0;
NETWORK
TITLE = STEP 3 PRINT TOOL
U M 23.2 // STEP 2
UN M 23.3 // STEP 3
UN M 27.1 // TOOL EXPRESSED
S M 53.0 // M70 EXPRESS TOOL
U M 23.2 // STEP 2
UN M 23.3 // STEP 3
U M 27.1 // TOOL EXPRESSED
S M 23.3 // STEP 3
NETWORK
TITLE = MOVE Z-AXIS TO TARGET POSITION
U M 23.3 // STEP 3
UN M 23.4 // STEP 4
SPBN M004;
L MD 78; // Z-AXIS 1MM UNDER SW LIMIT SWITCH
U M 40.0 // TOOL 0 SELECTED
SPB M104;
L MD 74; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
M104: NOP 0;
T MD 28 // Z-AXIS TARGET POSITION
CC FC 60 // Z-AXIS TRAVEL TO TARGET POSITION
U M 22.3 // Z-AXIS IS ON TARGET POSITION
S M 23.4 // STEP 4
S M 20.3 // RETURN TOOL DONE
R M 22.3 // Z-AXIS IS ON TARGET POSITION
M004: NOP 0;
END_FUNCTION
FUNCTION FC 58: VOID
NAME: PICK UP TOOL 0
BEGIN
NETWORK
TITLE = STEP 1 MOVE TOOL DISC TO POSITION 8
UN DB10.DBX 75.2; // RETRACT IN THE DISC AT T0 TOOL
SPBN M003;
UN M 21.0 // STEP 0
SPBN M002;
; L 0 // A-AXIS POSITION 0 DEGREES
L DB10.DBD 60 // Position for tool 8 in degrees
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 21.0 // STEP 0
S M 21.1 // STEP 1
M002: NOP 0;
M003: NOP 0;
NETWORK
```

```
TITLE = STEP 1 MOVE TOOL DISC TO POSITION 0
U DB10.DBX 75.2; // RETRACT IN THE DISC AT T0 TOOL
SPBN M010;
UN M 21.0 // STEP 0
SPBN M011;
L 0 // A-AXIS POSITION 0 DEGREES
T MD 48 // A-AXIS TARGET POSITION
CC FC 61 // MOVE A AXIS TO TARGET POSITION
U M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.1 // TOOL DISC VALID POSITION REACHED
S M 21.0 // STEP 0
S M 21.1 // STEP 1
M011: NOP 0;
M010: NOP 0;
NETWORK
TITLE = STEP 2
U M 21.1 // STEP 1
U M 40.0 // TOOL 0 SELECTED
S M 20.4 // PICK UP TOOL DONE
S M 25.0 // TOOL 0 PICK UP DONE
END_FUNCTION
FUNCTION FC 61: VOID
NAME: MOVE A-AXIS TO TARGET POSITION
BEGIN
NETWORK
TITLE = STEP 2 MOVE TOOL DISC TO VALID POSITION
UN M 22.0 // PIVOTING ACTIVE
UN M 22.1 // TOOL DISC VALID POSITION REACHED
SPBN M001;
S M 22.0 // PIVOTING ACTIVE
= DB25.DBX 1.4; // SEND NC BLOCK
= DB25.DBX 548.5; // SET EXACT HOLD MODE
= DB25.DBX 549.0; // G1 IS TRIGGERED
= DB25.DBX 549.4; // FEED RATE IN DEGREES / S VALUE IN DBD556
L DB10.DBD 28; // FEED VALUE IN DEGREES / SECONDS
T DB25.DBD 556; // F-VALUE IN M / S OR M / U
S DB25.DBX 21.4; // POSITION REQUEST FOR CHANNEL AXIS C
L MD 48 // A-AXIS TARGET POSITION
T DB25.DBD 70; // POSITION VALUE FOR CHANNEL AXIS C
L 0 // DELETE MW 46
T MW 46 // DELETE MW 46
U E 4.2; // 12mm BERO TOOL EQUIPPED
S M 46.1 // TOOL 1 PRESENT
U M 21.7 // HM TOOL TURNER DISC MOVE WITH 20% RAPID SPEED
SPBN M001;
L DB10.DBD 24; // T-1 ACCEPTANCE FEED VALUE IN DEGREES / SECONDS FOR TOOL DISC
T DB25.DBD 556; // F-VALUE IN M / S OR M / U
M001: NOP 0;
NETWORK
TITLE = CHECK WHETHER TOOL SPACE IS FREE
U DB25.DBX 332.0; // NC BLOCK DONE
U M 22.0 // PIVOTING ACTIVE
R DB25.DBX 332.0; // NC BLOCK DONE
S M 22.1 // TOOL DISC VALID POSITION REACHED
R M 22.0 // PIVOTING ACTIVE
U M 22.1 // TOOL DISC VALID POSITION REACHED
U M 20.5 // CHECK THAT THE TOOL AREA IS FREE
SPBN M002;
L MW 46 // TOOL EQUIPMENT
L MW 42 // CLAMPED TOOL FROM THE SETTING DATA
UW
T MW 44 // RESULTS OF TOOL HOLDER INSPECTION
L MW 44 // RESULTS OF TOOL HOLDER INSPECTION
L 0
```

```
<>·I.
S·DB3.DBX·7.1;·//·MELDUN
G·7057·TOOL·HOLDER·OCCUPIED
=·DB1.DBX·1440.0;·//·TRIGGER·NC·RESET
R·M·22.1·//·TOOL·DISC·VALID·POSITION·REACHED
M002:·NOP·0;
NETWORK
TITLE·=·CHECK·TOOLS·IN·DISC
U·E·4.2;·//·12mm·BERO·TOOL·EQUIPPED
FP·M·27.4
U·M·27.4
U·M·22.0·//·PIVOTING·ACTIVE
U·M·20.5·//·CHECK·THAT·THE·TOOL·AREA·IS·FREE
SPBN·M003;
;·Filter·tool·1·Bero
L·DB1.DBD·16
L·+·0.70E-02;
<R;
BEB
;·Tool·2
L·DB1.DBD·16
L·+·2.10E-02;
<R;
S·M·46.2·//·TOOL·2·PRESENT
BEB
;·Tool·3
L·DB1.DBD·16
L·+·3.20E-02;
<R;
S·M·46.3·//·TOOL·3·PRESENT
BEB
;·Tool·4
L·DB1.DBD·16
L·+·4.90E-02;·-
<R;
S·M·46.4·//·TOOL·4·PRESENT
BEB
;·Tool·5
L·DB1.DBD·16
L·+·6.30E-02;
<R;
S·M·46.5·//·TOOL·5·PRESENT
BEB
;·Tool·6
L·DB1.DBD·16
L·+·7.70E-02;
<R;
S·M·46.6·//·TOOL·6·PRESENT
BEB
;·Tool·7
L·DB1.DBD·16
L·+·9.10E-02;
<R;
S·M·46.7·//·TOOL·7·PRESENT
BEB
;·Tool·8
L·DB1.DBD·16
L·+·1.05E-01;
<R;
S·M·47.0·//·TOOL·8·PRESENT
BEB
M003:·NOP·0;
END_FUNCTION
FUNCTION·FC·51:·VOID
```

```
NAME: TOOL CLAMPING SYSTEM
BEGIN
UN E 4.1 // TOOL EXPRESSED
U DB10.DBX 2.0; // ACTIVATE AC 2000
= M 94.3; // SFG TOOL EXPRESSED
NETWORK
TITLE = EXPRESS THE TOOL WITH THE "CTRL + 1" OR "CTRL + ^" KEYS
// ALT U CTR ^ DB20.DBX 294.2 CHUCK OPEN / CLOSE
// ALT K CTR 1 DB20.DBX 294.5 SWIVEL TOOL ONE POSITION FURTHER
U DB20.DBX 294.5 // (CTRL 1 or Alt K) Express / retract tool
FP M 26.6 // FP-M (STRG 1 or Alt K) Push out / pull in tool
U DB20.DBX 294.2 // (CTRL ^ or ALT U) CHUCK OPEN / CLOSE
U M 200.0 // SET TOOL POSITIONS
O(
U M 26.6 // FP-M (STRG 1 or Alt K) Express / retract tool
UN M 200.0 // SET TOOL POSITIONS
)
U E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
U E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN M 52.0; // TOOL TURNING ACTIVE
U M 27.2 // EXPRESS RELEASE TOOL
FP M 27.3
U M 27.3
SPBN M101
L 0
T MW 40 // MW 40
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M101: NOP 0
NETWORK
TITLE = EXPRESS RELEASE TOOL
U M 15.2; // EMERGENCY STOP SWITCH
U M 114.3; // ACTUAL SPEED LESS THAN 20RPM
= M 27.2 // EXPRESS RELEASE TOOL
NETWORK
TITLE = EXPRESS TOOL
O M 27.3
O M 53.0; // EXPRESS M70 TOOL
UN M 27.1 // TOOL EXPRESSED
U M 27.2 // EXPRESS RELEASE TOOL
S A 6.0 // TOOL CLAMPING MOTOR
S M 27.6 // HM TOOL CLAMPING MOTOR EXPRESS
S M 94.1; // SFG TOOL EXPRESSED
R M 27.0 // TOOL RETRACTED
O M 27.6 // HM TOOL CLAMPING MOTOR EXPRESS
O DB1.DBX 1370.0; // 1st PLC LOOP
UN E 4.1 // TOOL EXPRESSED
U E 4.0 // TOOL DRAWN IN
O M 70.0; // FM EMERGENCY OFF PRESSED
R A 6.0 // TOOL CLAMPING MOTOR
R M 27.6 // HM TOOL CLAMPING MOTOR EXPRESS
R M 53.0; // EXPRESS M70 TOOL
S M 27.1 // TOOL EXPRESSED
SPBN M102
L 0
T DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
U DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
R M 52.3 // TOOL CANCELED
R DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
M102: NOP 0
NETWORK
TITLE = PULL IN TOOL
O(
U M 27.3
```

```
U M 200.0 // SET TOOL POSITIONS
)
O M 53.1; // PULL IN M72 TOOL
UN M 27.0 // TOOL RETRACTED
UN M 27.6 // HM TOOL CLAMPING MOTOR EXPRESS
U M 27.2 // EXPRESS RELEASE TOOL
S A 6.0 // TOOL CLAMPING MOTOR
S M 27.7 // PULL IN HM TOOL CLAMPING MOTOR
O M 27.7 // PULL IN HM TOOL CLAMPING MOTOR
O DB1.DBX 1370.0; // 1st PLC LOOP
UN E 4.0 // TOOL RETRACTED
U E 4.1 // TOOL EXPRESSED
O M 70.0; // FM EMERGENCY OFF PRESSED
R A 6.0 // TOOL CLAMPING MOTOR
R M 27.7 // HM PULL IN TOOL CLAMPING MOTOR
R M 53.1; // PULL IN M72 TOOL
S M 27.0 // TOOL RETRACTED
R M 27.1 // TOOL EXPRESSED
U M 27.0 // TOOL DRAWN IN
FP M 53.2; // PULL IN THE HM M72 TOOL
U M 53.2; // PULL IN THE HM M72 TOOL
UN DB1.DBX 1370.0; // 1st PLC LOOP
SPBN M103
L MW 40 // MW 40
T DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
M103: NOP 0
U M 27.1 // TOOL EXPRESSED
S M 94.1; // SFG TOOL EXPRESSED
U M 27.0 // TOOL ON
DRAWN
R M 94.1; // SFG TOOL EXPRESSED
END_FUNCTION
FUNCTION FC 52: VOID
NAME: SET TOOL POSITION FROM THE SETTING DATA
BEGIN
NETWORK
TITLE = SET TOOL POSITION FROM THE SETTING DATA
; Determine the return position for the clamped tool
L 0;
T MW 42
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 0;
== I;
= M 20.0 // NO TOOL NUMBER STORED
SPB M001
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 1
== I.
= M 42.0 // TOOL 0 CLAMPED
SPB M001
L DB10.DBD 32 // Position for tool 1 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 2
== I.
= M 42.1 // TOOL 1 CLAMPED
SPB M001
L DB10.DBD 36 // Position for tool 2 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 4
== I.
= M 42.2 // TOOL 2 CLAMPED
```

```
SPB M001
L DB10.DBD 40 // Position for tool 3 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 8
== I.
= M 42.3 // TOOL 3 CLAMPED
SPB M001
L DB10.DBD 44 // Position for tool 4 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 16
== I.
= M 42.4 // TOOL 4 CLAMPED
SPB M001
L DB10.DBD 48 // Position for tool 5 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 32
== I.
= M 42.5 // TOOL 5 CLAMPED
SPB M001
L DB10.DBD 52 // Position for tool 6 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 64
== I.
= M 42.6 // TOOL 6 CLAMPED
SPB M001
L DB10.DBD 56 // Position for tool 7 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 128
== I.
= M 42.7 // TOOL 7 CLAMPED
SPB M001
L DB10.DBD 60 // Position for tool 8 in degrees
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
L DB15.DBW 25; // CLAMPED TOOL IN THE SETTING DATA
L 256
== I.
= M 43.0 // TOOL 8 CLAMPED
SPB M001
L 0
T MD 32 // A-AXIS POSITION FOR CLAMPED TOOL
S M 20.2 // ILLEGAL TOOL NUMBER IN THE SETTING DATA
= DB3.DBX 7.0; // MESSAGE 7056 ILLEGAL TOOL NUMBER IN THE SETTING DATA
= DB1.DBX 1440.0; // TRIGGER NC RESET
M001: NOP 0
NETWORK
TITLE = TOOL DRAWN IN AND NO TOOL NUMBER STORED (BIG PROBLEM)
U M 20.0 // NO TOOL NUMBER STORED
U M 27.0 // TOOL DRAWN IN
SPBN M111
S DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
= DB1.DBX 1440.0; // TRIGGER NC RESET
M111: NOP 0
NETWORK
TITLE = TOOL EXPRESSED AND NO TOOL NUMBER STORED (NO PROBLEM)
U M 20.0 // NO TOOL NUMBER STORED
U M 27.1 // TOOL EXPRESSED
S M 20.1 // TOOL EXPRESSED AND NO TOOL NUMBER STORED
NETWORK
TITLE = SET TOOL WHEN STARTING UP
```

```
U DB1.DBX 1370.0; // 1st PLC LOOP
SPBN M110;
UN M 42.1;
SPB M113
L 1;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M113: NOP 0
UN M 42.2;
SPB M114
L 2;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M114: NOP 0
UN M 42.3;
SPB M115
L 3;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M115: NOP 0
UN M 42.4;
SPB M116
L 4;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M116: NOP 0
UN M 42.5;
SPB M117
L 5;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M117: NOP 0
UN M 42.6;
SPB M118
L 6;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M118: NOP 0
UN M 42.7;
SPB M119
L 7;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M119: NOP 0
UN M 43.0;
SPB M110
L 8;
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M110: NOP 0
END_FUNCTION
FUNCTION FC 53: VOID
NAME: CHECK NEW T-WORD AND DETERMINE A NEW TOOL DISC POSITION
BEGIN
NETWORK
TITLE = 7000 INCORRECT T-WORD PROGRAMMED
L DB20.DBW 184; // LOAD T-WORD
L 8; // CHARGE CONSTANT DEC 8
> I; // COMPARISON TO LARGER
= M 22.4 // T-WORD GREATER 10
L DB20.DBW 184; // LOAD T-WORD
L 0; // LOAD CONSTANT DEC 0
<I; // COMPARISON TO SMALLER
= M 22.5 // T-WORD LOWER 0
O M 22.4 // T-WORD LARGER 8
O M 22.5 // T-WORD LOWER 0
U DB20.DBX 182.0 // NEW T-WORD (TOOL)
SPBN M222
S DB3.DBX 0.0; // 7000 WRONG T-WORD
= DB1.DBX 1
440.0; // TRIGGER NC RESET
M222: NOP 0
```

```
NETWORK
TITLE = T-WORD IS VALID
UN DB3.DBX 0.0; // 7000 WRONG T-WORD
SPBN M002
L 0 // DELETE MW 40
T MW 40 // DELETE MW 40
L DB20.DBW 184; // T-WORD
L 0
== I.
= M 40.0 // TOOL 0 SELECTED (RETURN CLAMPED TOOL
; OR PULL IN TOOL CHIPPING SYSTEM)
SPB M002
L DB10.DBD 32 // Position for tool 1 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 1
== I.
= M 40.1
SPB M002
L DB10.DBD 36 // Position for tool 2 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 2
== I.
= M 40.2
SPB M002
L DB10.DBD 40 // Position for tool 3 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 3
== I.
= M 40.3
SPB M002
L DB10.DBD 44 // Position for tool 4 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 4
== I.
= M 40.4
SPB M002
L DB10.DBD 48 // Position for tool 5 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 5
== I.
= M 40.5
SPB M002
L DB10.DBD 52 // Position for tool 6 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 6
== I.
= M 40.6
SPB M002
L DB10.DBD 56 // Position for tool 7 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
L 7
== I.
= M 40.7
SPB M002
L DB10.DBD 60 // Position for tool 8 in degrees
T MD 36 // NEW A-AXIS POSITION
L DB20.DBW 184; // T-WORD
```

```
L 8
== I.
= M 41.0
M002: NOP 0
L MW 40 // NEW TOOL FROM VALID T-WORD
L MW 42 // CLAMPED TOOL FROM THE SETTING DATA
<> I; // COMPARE TO INEQUAL
= M 22.6 // T-WORD NOT EQUAL TO TOOL
L MW 40 // NEW TOOL FROM VALID T-WORD
L MW 42 // CLAMPED TOOL FROM THE SETTING DATA
== I; // COMPARE TO INEQUAL
= M 26.1 // NEW T-WORD EQUALS TOOLS
END_FUNCTION
FUNCTION FC 60: VOID
NAME: MOVE Z-AXIS TO TARGET POSITION
BEGIN
UN M 22.2 // Z-AXIS MOVE TO TARGET POSITION ACTIVE
SPBN M001;
S M 22.2 // Z-AXIS MOVE TO TARGET POSITION ACTIVE
R M 22.3 // Z-AXIS IS ON TARGET POSITION
= DB25.DBX 1.4; // SEND NC BLOCK
= DB25.DBX 548.7 // G0 is triggered
= DB25.DBX 20.2; // POSITION REQUEST FOR Z-AXIS
L MD 28 // Z-AXIS TARGET POSITION
T DB25.DBD 30; // POSITION VALUE FOR Z-AXIS
M001: NOP 0;
U DB25.DBX 332.0; // NC BLOCK DONE
U M 22.2 // Z-AXIS MOVE TO TARGET POSITION ACTIVE
R M 22.2 // Z-AXIS MOVE TO TARGET POSITION ACTIVE
S M 22.3 // Z-AXIS IS ON TARGET POSITION
R DB25.DBX 332.0; // NC BLOCK DONE
END_FUNCTION
FUNCTION FC 23: VOID
NAME: SAFETY CIRCUIT ACC
BEGIN
// X6: 1 I 2.0 = M 15.0 // 1st door limit switch MACHINE DOOR CLOSED (MAIN MOTOR
CONTACTOR ON)
// Monitoring whether HA contactors have dropped out (must have 0 signal
// be with the door or wheel cover open or the EMERGENCY STOP pressed)
// X6: 2 I 2.1 = M 15.1 // 1st door limit switch MACHINE DOOR OPEN
// (0 signal when the door is closed!)
// X6: 5 I 2.5 // only MILL55 ACC 2nd door limit switch MACHINE DOOR CLOSED 2nd door
limit switch
// (0 signal when the door is closed!)
// X6: 10 A 3.4 // only MILL55 ACC safety output for relay (category 3)
NETWORK
TITLE = SAFETY CIRCUIT DEFECTIVE K1, K2 OR K3 STUCK
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
; U E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
; U E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
U E 2.0; // K1, K2, or K3 ON (1 SIGNAL WHEN THE DOOR IS CLOSED)
O(
U A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
UN E 2.0; // K1, K2, or K3 ON (1 SIGNAL WHEN THE DOOR IS CLOSED)
)
L S5TIME # 1S;
SE T 6; // T6 SWITCH-ON DELAYED
U T 6; // T6
S DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
NETWORK
TITLE = MACHINE DOOR CLOSED
U (
```

```
O DB1.DBX 1370.0; // 1st PLC LOOP
O M 1.0 // HM MACHINE DOOR OPEN
)
UN E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN E 2.0; // K1, K2, or K3 ON (1 SIGNAL WHEN THE DOOR IS CLOSED)
S A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
NETWORK
TITLE = MACHINE DOOR OPEN
O E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
O E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN CLOSED
NER DOOR)
R A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
NETWORK
SET TITLE = HM WITH THE MACHINE DOOR OPEN
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
U E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
U E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN E 2.0; // K1, K2, or K3 ON (1 SIGNAL WHEN THE DOOR IS CLOSED)
UN M 1.0 // HM MACHINE DOOR OPEN
S M 1.1 // HM MACHINE DOOR OPEN
NETWORK
TITLE = 10S RECOVERY TIME FOR LENDER
U M 1.1 // HM MACHINE DOOR OPEN
L S5TIME # 10S; // 10S
SE T 12; // SWITCH-ON DELAY
U DB1.DBX 1370.0; // 1st PLC LOOP
U M 1.1 // HM MACHINE DOOR OPEN
O T 12; // SWITCH-ON DELAY
S M 1.0 // HM MACHINE DOOR OPEN
R M 1.1 // HM MACHINE DOOR OPEN
NETWORK
TITLE = MESSAGE 7023 WAITING TIME MAIN DRIVE
UN M 1.0 // HM MACHINE DOOR OPEN
UN E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
UN E 2.0; // K1, K2, or K3 ON (1 SIGNAL WHEN THE DOOR IS CLOSED)
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
= DB3.DBX 2.7; // MESSAGE 7023 WAITING TIME MAIN DRIVE
= M 90.0; // WAITING TIME MAIN DRIVE AFG / EFG
= M 96.2; // WAITING TIME MAIN DRIVE NC_START VERR.
U A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
R M 1.0 // HM MACHINE DOOR OPEN
U A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
FP M 120.5 // FM OUTPUT FOR AUXILIARY RELAY DOOR CLOSED
U A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
FN M 120.6 // NEGATIVE-FM DOOR OPEN
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
= M 96.3; // OUTPUT FOR AUXILIARY RELAY DOOR CLOSED NC_START LOCK.
END_FUNCTION
FUNCTION FC 34: VOID
NAME: ASSIGN INPUTS AC95 - ACC
BEGIN
NETWORK
TITLE = DOOR SWITCH ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 2.0; // MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.5; // MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
= M 15.0; // MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
NETWORK
TITLE = DOOR SWITCH ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
```

```
UN M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
O(
U M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
U E 2.1; // DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
)
O(
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.6; // DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
)
UN DB1.DBX 1370.0; // 1st PLC LOOP
= M 15.1; // MACHINE DOOR OPEN
NETWORK
TITLE = EMERGENCY OFF ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 2.2; // EMERGENCY STOP AC 2000
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.4; // EMERGENCY STOP AC 95
= M 15.2; // EMERGENCY STOP SWITCH
U M 15.2; // EMERGENCY STOP SWITCH
FN M 70.0; // FM EMERGENCY OFF PRESSED
NETWORK
TITLE = WHEEL COVER LIMIT SWITCH ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 2.3; // WHEEL COVER LIMIT SWITCH (IN SERIES WITH EMERGENCY STOP!)
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.7; // WHEEL COVER LIMIT SWITCH (IN SERIES WITH EMERGENCY STOP!)
= M 15.6; // WHEEL COVER LIMIT SWITCH (IN SERIES WITH EMERGENCY STOP!)
NETWORK
TITLE = SERVO READY ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 0.0; // SERVO READY AXIS 0 (X)
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000 6
U E 1.0; // SERVO READY AXIS 0 (X)
= M 15.3; // SERVO READY AXIS 0 (X)
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 0.1; // SERVO READY AXIS 1 (Y)
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.1; // SERVO READY AXIS 1 (Y)
= M 15.4; // SERVO READY AXIS 1 (Y)
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 0.2; // SERVO READY AXIS 2 (Z)
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.2; // SERVO READY AXIS 2 (Z)
= M 15.5; // SERVO READY AXIS 2 (Z)
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 0.3; // SERVO READY HA
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 1.3; // SERVO READY HA
= M 15.7; // SERVO READY HA
NETWORK
TITLE = N = 0 FROM LENZE INVERTER ASSIGNMENT
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 2.4; // n = 0 RELAY FROM LENZE-FU
O
UN DB10.DBX 2.0; // ACTIVATE AC 2000
U E 2.3; // n = 0 RELAY FROM LENZE-FU
= M 16.0; // n = 0 RELAY FROM LENZE-FU
```

```
END_FUNCTION
FUNCTION FC 35: VOID
NAME: ASSIGN THE OUTPUTS AC95 - - ACC
BEGIN
U DB10.DBX 2.0; // ACTIVATE AC 2000
SPBN M001;
// ASSIGN ACC KEY TO OPEN DOOR (MSTT)
U DB1.DBX 1403.7; // Concept CAM
U DB1.DBX 1374.0; // MACHINE KEYBOARD DOOR OPEN
O(
UN DB1.DBX 1403.7; // Concept CAM
U DB1.DBX 13
74.1; // MACHINE KEYBOARD DOOR CLOSED
)
= M 138.1; // HM MACHINE KEYBOARD DOOR OPEN
// ASSIGN ACC KEY DOOR CLOSED (MSTT)
U DB1.DBX 1403.7; // Concept CAM
U DB1.DBX 1374.1; // MACHINE KEYBOARD DOOR CLOSED
O(
UN DB1.DBX 1403.7; // Concept CAM
U DB1.DBX 1374.0; // MACHINE KEYBOARD DOOR OPEN
)
= M 138.2; // HM MACHINE KEYBOARD DOOR CLOSED
// ACC BUTTON ASSIGN VICE ACC
U DB20.DBX 294.3; // VICE CLOSE BUTTON (PC)
UN DB20.DBX 294.4; // VICE OPEN BUTTON (PC)
FP M 138.7; // FM BUTTON VICE CLOSED ACC
// ACC BUTTON ASSIGN VICE TO ACC
U DB20.DBX 294.4; // VICE OPEN BUTTON (PC)
UN DB20.DBX 294.3; // VICE CLOSE BUTTON (PC)
FP M 137.1; // FM BUTTON VICE ON ACC
// ASSIGN ACC ENABLE AXES
U M 17.0; // EXIT FLAG ENABLE AXES
= A 3.0; // ENABLE SM MODULE A
UN M 2.0; // IDENTIFICATION CONVERSION TO ACC
SPBN M3501;
U M 17.0; // EXIT FLAG ENABLE AXES
U A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
L S5TIME # 1500MS; // 1.5 S
SE T 13; // SWITCH-ON DELAY
U T 13; // SWITCH-ON DELAY
= A 3.1; // ENABLE SM MODULE B
ON A 3.1; // ENABLE SM MODULE B
O E 0.5; // Servo Ready tool turret drive (physical axis 4)
U M 52.5 // TOOL TURNER ACTIVATED
O(
ON A 3.1; // ENABLE SM MODULE B
O E 0.4; // Servo Ready round axis drive (physical axis 5)
U M 52.7 // ROUND AXIS ACTIVATED
)
= M 90.3; // ENABLE SM MODUL B AFG / EFG
= M 96.4; // ENABLE SM MODUL B NC_START VERR.
M3501: NOP 0;
// ASSIGN ACC CONTROLLER ENABLE MAIN DRIVE
U M 17.1; // INITIAL FLAG CONTROLLER ENABLE MAIN DRIVE
= A 0.3; // CONTROLLER ENABLE MAIN DRIVE
// ASSIGN ACC COOLANT (M8 = ON / M9 = OFF)
U M 17.2; // EXIT FLAG COOLANT (M8 = ON / M9 = OFF)
= A 3.3; // COOLANT (M8 = ON / M9 = OFF)
// ASSIGN ACC MINIMUM LUBRICATION
U M 18.0; // INITIAL FLAG MINIMAL LUBRICATION
= A 4.0; // MINIMAL LUBRICATION
// ASSIGN ACC BLOW-OUT VALVE
U M 18.2; // EXIT FLAG BLOW-OUT VALVE
```

```
=·A·4.2;·//·EXHAUST·VALVE
//·ASSIGN·ACC·DOOR·OPEN
U·M·18.3;·//·EXIT·FLAG·DOOR·OPEN
=·A·4.3;·//·OPEN·THE·DOOR
//·ASSIGN·ACC·DOOR
U·M·18.4;·//·EXIT·FLAG·DOOR·CLOSED
=·A·4.4;·//·CLOSE·THE·DOOR
//·ASSIGN·ACC·VICE·TO·CLAMP
U·M·18.5;·//·EXIT·FLAG·CLAMP·VICE
=·A·4.5;·//·CLAMPING·THE·VICE
//·ASSIGN·ACC·TO·RELEASE·VICE
U·M·18.6;·//·RELEASE·THE·EXIT·FLAG·VICE
=·A·4.6;·//·RELEASE·THE·VICE
//·ASSIGN·ACC·TO·SHARE·PARTS
U·M·18.7;·//·SHARE·EXIT·FLAG·SUB-APPARATUS
=·A·4.7;·//·SHARE·PARTIAL·APPLIANCE
//·ASSIGN·ACC·ROBOTICS·PROGRAM·STOP·(M30,·M0,·M1,·M2)
U·M·19.0;·//·EXIT·FLAG·ROBOTICS·PROGRAM·STOP·(M30,·M0,·M1,·M2)
=·A·5.0;·//·ROBOTIC·PROGRAM·STOP·(M30,·M0,·M1,·M2)
//·ACC·ROBOTICS·AXES·ARE·AT·REF.·POINT.
U·M·19.1;·//·ROBOTICS·AXES·ARE·AT·REF.·POINT.
=·A·5.1;·//·ROBOTICS·AXES·ARE·AT·REF.·POINT.
//·ACC·ROBOTICS·ASSIGN·THE·DOOR·OPEN
U·M·19.3;·//·EXIT·FLAG·ROBOTICS·DOOR·OPEN
=·A·5.3;·//·ROBOTICS·DOOR·OPEN
//·ASSIGN·ACC·ROBOTICS·CLOSED·DOOR
U·M·19.4;·//·EXIT·FLAG·ROBOTICS·DOOR·CLOSED
=·A·5.4;·//·ROBOTIC·DOOR·CLOSED
//·ASSIGN·ACC·ROBOTICS·REAR·VICE
U·M·19.5;·//·INITIAL·FLAG·ROBOTICS·REAR·VICE
=·A·5.5;·//·REAR·ROBOTIC·VICE
//·ASSIGN·ACC·ROBOTICS·CLAMPED·VICE
U·M·19.6;·//·EXIT·FLAG·ROBOTICS·VICE·CLAMPED
=·A·5.6;·//·ROBOTIC·VICE·CLAMPED
//·ASSIGN·ACC·ROBOTICS·ALARM·OUTPUT
U·M·19.7;·//·EXIT·FLAG·ROBOTICS·ALARM·OUTPUT
=·A·5.7;·//·ROBOTIC·ALARM·OUTPUT
M001:·NOP·0;
UN·DB10.DBX·2.0;·//·ACTIVATE·AC·2000
SPBN·M002;
//·AC95·ASSIGN·THE·OPEN·DOOR·KEY·(MSTT)
U·DB1.DBX·1374.0;·//·MACHINE·KEYBOARD·DOOR·ON·AC95
=·M·138.1;·//·HM·MACHINE·KEYBOARD·DOOR·OPEN
//·AC95·ASSIGN·DOOR·CLOSED·KEY·(MSTT)
U·DB1.DBX·1374.1;·//·MACHINE·KEYBOARD·DOOR·TO·AC95
=·M·138.2;·//·HM·MACHINE·KEYBOARD·DOOR·CLOSED
//·AC95·BUTTON·ASSIGN·VICE·AC95
U·DB20.DBX·294.4;·//·VICE·CLOSE·BUTTON·(PC)
UN·DB20.DBX·294.3;·//·VICE·OPEN·BUTTON·(PC)
FP·M·138.7;·//·FM·KEY·VICE·TO·AC95
//·AC95·BUTTON·ASSIGN·VICE·TO·AC95
U·DB20.DBX·294.3;·//·VICE·OPEN·BUTTON·(PC)
UN·DB20.DBX·294.4;·//·VICE·CLOSE·BUTTON·(PC)
FP·M·137.1;·//·FM·BUTTON·VICE·ON·AC95
//·AC95·RELEASE·ASSIGN·AXES
U·M·17.0;·//·EXIT·FLAG·ENABLE·AXES
=·A·0.1;·//·AXES·ENABLE
//·ASSIGN·AC95·CONTROLLER·ENABLE·MAIN·DRIVE
U·M·17.1;·//·INITIAL·FLAG·CONTROLLER·ENABLE·MAIN·DRIVE
=·A·0.0;·//·CONTROLLER·ENABLE·MAIN·DRIVE
EB
//·AC95·COOLANT·ASSIGN·(M8·=·ON·/·M9·=·OFF)
U·M·17.2;·//·EXIT·FLAG·COOLANT·(M8·=·ON·/·M9·=·OFF)
=·A·0.4;·//·COOLANT·(M8·=·ON·/·M9·=·OFF)
```

```
// ASSIGN AC95 BLOW-OUT VALVE
U M 18.2; // EXIT FLAG BLOW-OUT VALVE
= A 4.2; // EXHAUST VALVE
// AC95 ASSIGN THE DOOR OPEN
U M 18.3; // EXIT FLAG DOOR OPEN
= A 4.3; // OPEN THE DOOR
// ASSIGN AC95 DOOR
U M 18.4; // EXIT FLAG DOOR CLOSED
= A 4.4; // CLOSE THE DOOR
// AC95 ASSIGN VICE TO CLAMP
U M 18.5; // EXIT FLAG CLAMP VICE
= A 4.5; // CLAMPING THE VICE
// AC95 RELEASE VICE ASSIGN
U M 18.6; // RELEASE THE EXIT FLAG VICE
= A 4.6; // RELEASE THE VICE
// AC95 ASSIGN SHARED UNIT
U M 18.7; // SHARE EXIT FLAG SUB-APPARATUS
= A 4.7; // SHARE PARTIAL APPLIANCE
// AC95 ASSIGN ROBOTICS PROGRAM STOP (M30, M0, M1, M2)
U M 19.0; // EXIT FLAG ROBOTICS PROGRAM STOP (M30, M0, M1, M2)
= A 5.0; // ROBOTIC PROGRAM STOP (M30, M0, M1, M2)
// AC95 ROBOTIC AXES ARE AT REF.PKT.
U M 19.1; // ROBOTICS AXES ARE AT REF. POINT.
= A 5.1; // ROBOTICS AXES ARE AT REF. POINT.
// AC95 ASSIGN ROBOTIC DOOR OPEN
U M 19.3; // EXIT FLAG ROBOTICS DOOR OPEN
= A 5.3; // ROBOTICS DOOR OPEN
// AC95 ASSIGN ROBOTICS CLOSED DOOR
U M 19.4; // EXIT FLAG ROBOTICS DOOR CLOSED
= A 5.4; // ROBOTIC DOOR CLOSED
// AC95 ASSIGN ROBOTICS REAR VICE
U M 19.5; // INITIAL FLAG ROBOTICS REAR VICE
= A 5.5; // REAR ROBOTIC VICE
// AC95 ASSIGN ROBOTIC VICE CLAMPED
U M 19.6; // EXIT FLAG ROBOTICS VICE CLAMPED
= A 5.6; // ROBOTIC VICE CLAMPED
// AC95 ASSIGN ROBOTICS ALARM OUTPUT
U M 19.7; // EXIT FLAG ROBOTICS ALARM OUTPUT
= A 5.7; // ROBOTIC ALARM OUTPUT
M002: NOP 0;
END_FUNCTION
FUNCTION FC 0: VOID
NAME: TOOL TURNERS
BEGIN
NETWORK 1
UN DB20.DBX 182.0; // NEW T-WORD
SPB M001;
L DB20.DBW 184; // T-WORD
T DB20.DBW 356; // ACTIVE TOOL IN DB20
M001: NOP 0;
NETWORK 2
L DB20.DBW 184; // T-WORD
L W # 16 # 1; // HEX 1
<I; // COMPARISON TO SMALLER
U DB20.DBX 182.0; // NEW T-WORD
= M 125.1; // T-WORD LOWER 1
NETWORK 3
L DB20.DBW 184; // T-WORD
L W # 16 # 63; // TOOL NO. 99
>I; // COMPARISON TO LARGER
U DB20.DBX 182.0; // NEW T-WORD
= M 125.2; // T-WORD GREATER 99
NETWORK 4
O M 125.1; // T-WORD LOWER 1
```

```
O M 125.2; // T-WORD GREATER 99
S DB3.DBX 0.0; // T-WORD INVALID
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB3.DBX 0.0;
END_FUNCTION
FUNCTION FC 1: VOID
NAME: INITIALIZATIONS
BEGIN
NETWORK 1
TITLE = M0, M1 TRIP
U DB20.DBX 224.1; // M1 ACTIVE
U DB20.DBX 324.5; // CONDITIONAL STOP ACTIVE
O DB20.DBX 224.0 // M0 ACTIVE
= M 0.0; // M0 / M1 ACTIVE
U DB20.DBX 192.1; // M1 DYNAMIC
U DB20.DBX 324.5; // CONDITIONAL STOP ACTIVE
O DB20.DBX 192.0; // M0 DYNAMIC
= M 0.1; // HM M0 / M1 DYNAMIC
O DB20.DBX 192.0; // M0 DYNAMIC
= DB20.DBX 256.0; // REPORT M0
U DB20.DBX 192.1; // M1 DYNAMIC
U DB20.DBX 324.5; // CONDITIONAL STOP ACTIVE
= DB20.DBX 256.1; // REPORT M1
NETWORK 2
TITLE = DOOR FEEDBACKS
UN DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
UN M 15.1; // MACHINE DOOR OPEN
= DB1.DBX 1390.1; // PLC> SURF. DOOR CLOSED
UN DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
UN DB1.DBX 1390.1; // PLC> SURF. DOOR CLOSED
= DB1.DBX 1390.0; // PLC> SURF. DOOR OPEN
NETWORK 3
TITLE = PLC / OB -> SINGLE ITEM ACTIVE
UN DB10.DBX 1.0; // PLC-MSD CONTINUOUS RUN ACTIVE
= DB1.DBX 1390.3; // PLC / RM -> SINGLE ITEM ACTIVE
NETWORK $ 4
TITLE = FEED SWITCH ON 0%
L DB20.DBW 358; // FEED OVERRIDE ACTUAL VALUE
L W # 16 # 0000; // LOAD 0
== I; // COMPARISON TO EQUAL
= M 100.2; // FEED SWITCH ON 0%
NETWORK 5
TITLE = 6008 MISSING CAN PART.
O DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
O DB10.DBX 75.1; // tbsp. ACTIVATE VICE
O DB10.DBX 75.3; // ACTIVATE THE BLOW DEVICE
O DB10.DBX 75.6; // ACTIVATE SCHÄFER PARTIAL APPLIANCE
O DB10.DBX 75.7; // ACTIVATE ROBOTICS INTERFACE
U (;
ON DB1.DBX 1414.0; // 1st CAN INPUT PORT (CAN ADDRESS 0)
ON DB1.DBX 1415.0; // 1st CAN OUTPUT PORT (CAN ADDRESS 7)
);
UN DB10.DBX 2.0; // ACTIVATE AC 2000
= DB2.DBX 1.0; // 6008 MISSING CAN PART.
NETWORK 6
TITLE = SELECTION OF THE FREQUENCY INVERTER
L DB10.DBB 20; // HARWARE COMPONENTS
L 0
== I; // COMPARISON TO EQUAL
= M 115.0; // FELDERER FU
L DB10.DBB 20; // HARWARE COMPONENTS
L 1
== I; // COMPARISON TO EQUAL
```

```
=·M·115.1;·//·LENZE·FU
END_FUNCTION
FUNCTION·FC·2:·VOID
NAME:·ITEM·COUNTER
BEGIN
NETWORK·1
TITLE·=·PIECE·COUNTER
UN·DB20.DBX·192.2;·//·M2·dyn
UN·DB20.DBX·195.6;·//·M30·dyn
O·DB20.DBX·324.2;·//·DRYRUN·ACTIVE
SPB·M214;
SET;
L·DB15.DBD·4;·//·Counter
L·DW·#·16·#·000F_423F;·//·999999·PIECES
<>·D;
SPB·M211;
SET;
L·DW·#·16·#·0000_0000;
T·DB15.DBD·4;
M211:·NOP·0;
L·DB15.DBD·4;
L·DW·#·16·#·0000_0001;
+·D;·//·Piece·counter·+1·low
T·DB15.DBD·4;
L·DB15.DBD·8;·//·BATCH·COUNTER
L·DW·#·16·#·000F_423F;·//·999999·PIECES
<>·D;
SPB·M213;
SET;
L·DW·#·16·#·0000_0000;
T·DB15.DBD·8;
M213:·NOP·0;
L·DB15.DBD·8;
L·DW·#·16·#·0000_0001;
+·D;·//·Piece·counter·+1·low
T·DB15.DBD·8;
M214:·L·DB15.DBD·0;·//·target·number
L·DW·#·16·#·0000_0000;
<>·D;
SPB·M202;
SPA·M201;
M202:·NOP·0;
L·DB15.DBD·4;·//·Qty.
L·DB15.DBD·0;·//·target·number
<D;
SPB·M201;
SET;
S·DB3.DBX·5.3;·//·7043·TARGET·QUANTITY·REACHED
L·DW·#·16·#·0;
T·DB15.DBD·4;
M201:·NOP·0;
NETWORK·2
TITLE·=·NC·START·LOCKING
U·DB3.DBX·5.3;·//·Message·target·quantity·reached
=·M·96.6;·//·Message·target·quantity·reached·NC_START·VERR.
O·DB1.DBX·1370.2;·//·ACKNOWLEDGMENT·KEY·PRESSED
O·DB1.DBX·1370.3;·//·RESET·KEY·PRESSED
R·DB3.DBX·5.3;·//·Message·target·quantity·reached
END_FUNCTION
FUNCTION·FC·3:·VOID
NAME:·MAIN·DRIVE·FELDERER·FU
BEGIN
//·OUTPUTS:
//·**********·ACC·**********.**********
```

```
U DB10.DBX 2.0; // ACTIVATE ACC
SPBN M001;
NETWORK
TITLE = CONTROLLER ENABLE FOR MAIN DRIVE
O DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
O DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
S M 145.2;
U M 145.2;
U M 104.2; // SUM SFG
O
UN M 114.3; // ACTUAL SPEED LESS THAN 20RPM
U M 145.7 // HM CONTROLLER ENABLE FOR MAIN DRIVE
= A 3.1 // AXES ENABLE B = CONTROLLER ENABLE FOR MAIN DRIVE
S M 145.7 // HM CONTROLLER ENABLE FOR MAIN DRIVE
NETWORK
TITLE = SET OUTPUT FOR PUL UP
UN A 3.4
S A 3.4
M001: NOP 0;
NETWORK 1
TITLE = FELDERER MAIN DRIVE READY TO OPERATE
UN M 15.7; // HA READY TO OPERATE
= M 94.2; // SFG
NETWORK 2
TITLE = FIELDS MONITORING HA SHARP
U M 110.0; // AUX-ON
L S5TIME # 2S; // 2S
SE T 2; // SWITCH-ON DELAY
NETWORK 3
TITLE = FELDERER 6013 MAIN DRIVE NOT READY
UN DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 15.7; // HA SERVO-READY
L S5TIME # 200MS; // 0.2S
SE T 3; // SWITCH-ON DELAY
U T 2;
U T 3;
S DB2.DBX 1.5; // MAIN DRIVE NOT READY 6013
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.5;
NETWORK 4
TITLE = FELDERER FM BUTTON SPINDLE START (MSST)
O DB20.DBX 295.4; // SPINDLE START BUTTON
UN M 200.0 // SET TOOL POSITIONS
FP M 132.5; // FM BUTTON SPINDLE START
NETWORK 5
TITLE = FELDERER FM KEY SPINDLE STOP (MSST)
O DB20.DBX 295.3; // KEY SPINDLE HOLD
UN M 200.0 // SET TOOL POSITIONS
FP M 132.7; // FM KEY SPINDLE STOP
NETWORK 6
TITLE = FIELDS CHANGE DIRECTION OF ROTATION WITH THE START BUTTON
U M 106.7; // M3 / M4 SPINDLE START ENABLE
UN DB20.DBX 324.0; // PROGRAM RUNNING
U M 132.5; // FM BUTTON SPINDLE START
S M 108.3; // HM SPINDLE SWITCHED ON
L S5TIME # 1S; // 1 SECOND
SV T 44; // LONGER PULSE
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 108.3; // HM SPINDLE SWITCHED ON
NETWORK 7
TITLE = FELDERER NEGATIVE FLANKENMERKER
U T 44; // EXTENDED PULSE M3 / M4
```

```
FN M 108.2; // FM / SPINDLE START BUTTON
NETWORK 8
TITLE = FELDERER
U M 104.2; // SUM SFG
UN M 131.7; // AXES IN MOVEMENT
UN M 114.3; // ACTUAL SPEED LESS THAN 20RPM
U M 132.7; // FM KEY SPINDLE STOP
S M 132.1; // SPINDLE STOP ACTIVE
S M 95.7; // SFG
S M 91.7; // AFG, EFG
U M 106.7; // OPERATION MANUAL AND INC1 UP TO 10000
R M 91.7; // AFG, EFG
U M 110.0; // AUX ON
U M 132.5; // FM BUTTON SPINDLE START
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 132.1; // SPINDLE STOP ACTIVE
R M 95.7; // SFG
R M 91.7; // AFG, EFG
NETWORK 9
TITLE = FELDERER
UN M 110.0; // AUX-ON
= M 95.0; // SPINDLE ENABLE
NETWORK 10
TITLE = FIELDS SUM SFG
L MW 94; // WORD SFG (SPINDLE ENABLE)
L W # 16 # 0; // H 0
== I; // COMPARISON TO EQUAL
= M 104.2; // SUM SFG
NETWORK 11
TITLE = FELDERER MAIN DRIVE ENABLE
U M 104.2; // SUM SFG
UN DB1.DBX 1440.0; // RESET TRIPPED
= M 114.0; // MAIN DRIVE ENABLE
NETWORK 12
TITLE = FIELDS SELECTION MAIN DRIVE M3
U M 114.0; // HA RELEASE
U (;
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U M 104.3; // SUM NC-STARTVERR.
U M 101.0; // NC START MEMORY
U M 100.6; // M3 MEMORY
O;
U DB20.
DBX 192.3; // M3 DYN.
O;
U T 44; // EXTENDED PULSE M3 / M4
UN DB20.DBX 295.4; // SPINDLE START BUTTON
);
= DB20.DBX 256.3; // RELEASE M3
S DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R M 100.6; // M3 MEMORY
NETWORK 13
TITLE = FIELDS SELECTION MAIN DRIVE M4
U M 114.0; // HA RELEASE
U (;
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U M 104.3; // SUM NC-STARTVERR.
U M 101.0; // NC START MEMORY
U M 100.7; // M4 MEMORY
O;
U DB20.DBX 192.4; // M4 DYN.
O;
```

```
U M 108.2; // FM / T44 M3 / M4
U DB20.DBX 295.4; // SPINDLE START BUTTON
);
= DB20.DBX 256.4; // TRIGGER M4
S DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R M 100.7; // M4 MEMORY
NETWORK 14
TITLE = FIELDS SELECTION MAIN DRIVE M5
U M 108.3; // HM SPINDLE SWITCHED ON
U (;
O M 132.7; // FM KEY SPINDLE STOP
ON M 106.7; // M3 / M4 SPINDLE START ENABLE
);
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB20.DBX 192.5; // M5 DYNAMIC
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB20.DBX 324.2; // DRYRUN ACTIVE
= M 114.5; // M5 HM
NETWORK 15
TITLE = FIELDS M3, M4 SAVE AT M0, M1
U M 0.1; // HM M0 / M1 STATIC
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U DB20.DBX 224.3; // M3 STATIC
S M 100.6; // M3 MEMORY
U M 0.1; // HM M0 / M1 STATIC
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U DB20.DBX 224.4; // M4 STATIC
S M 100.7; // M4 MEMORY
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R M 100.6; // M3 MEMORY
R M 100.7; // M4 MEMORY
NETWORK 16
TITLE = FIELDS M5 OF M0, M1 AND M5 HM
U M 0.1; // HM M0 / M1 STATIC
U (;
O DB20.DBX 224.3; // M3 STATIC
O DB20.DBX 224.4; // M4 STATIC
);
O M 114.5; // M5 HM
UN M 101.0; // NC START MEMORY
O DB20.DBX 195.6; // M30 DYN.
O DB20.DBX 192.2; // M2 DYN.
= DB20.DBX 256.5; // TRIP M5
R DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R M 108.3; // HM SPINDLE SWITCHED ON
R M 145.2
NETWORK 17
TITLE = FELDERER SPINDLE ENABLE
U M 114.0; // HA RELEASE
= DB20.DBX 340.5; // SPINDLE ENABLE
// END OF THE BUILDING
NETWORK 18
TITLE = FELDERER MAIN DRIVE IS ON
O DB20.DBX 224.5; // M5 STATIC
ON M 114.0; // HA RELEASE
= M 114.3; // ACTUAL SPEED LESS THAN 20RPM
END_FUNCTION
FUNCTION FC 33: VOID
NAME: MAIN DRIVE LENZE FU
BEGIN
```

```
NETWORK 1
TITLE = LENZE MAIN DRIVE READY TO OPERATE
UN M 15.7; // SERVO READY HA
= M 94.2; // SFG
= M 96.7; // SERVO READY MAIN DRIVE NC_START VERR.
NETWORK 2
TITLE = LENZE MONITORING HA SHARP
U M 110.0; // AUX-ON
L S5TIME # 4S; // 4S
SE T 2; // SWITCH-ON DELAY
NETWORK 3
TITLE = LENZE 6013 MAIN DRIVE NOT READY
; UN DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 15.7; // SERVO READY HA
L S5TIME # 200MS; // 0.2S
SE T 3; // INPUT FILTER
U T 2;
U T 3;
S DB2.DBX 1.5; // MAIN DRIVE NOT READY 6013
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.5;
NETWORK 4
TITLE = LENZE FM BUTTON SPINDLE START (MSST)
O DB20.DBX 295.4; // SPINDLE START BUTTON
UN M 200.0 // SET TOOL POSITIONS
FP M 132.5; // FM BUTTON SPINDLE START
NETWORK 5
TITLE = LENZE FM BUTTON SPINDLE HOLD (MSST)
O DB20.DBX 295.3; // KEY SPINDLE HOLD
UN M 200.0 // SET TOOL POSITIONS
FP M 132.7; // FM KEY SPINDLE STOP
NETWORK 6
TITLE = LENZE
U M 106.7; // M3 / M4 SPINDLE START ENABLE
UN DB20.DBX 324.0; // PROGRAM RUNNING
U M 132.5; // FM BUTTON SPINDLE START
S M 108.3; // HM SPINDLE SWITCHED ON
L S5TIME # 1S; // 1 SECOND
SV T 44; // LONGER PULSE
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 108.3; // HM SPINDLE SWITCHED ON
NETWORK 7
TITLE = LENZE NEGATIVE FLANKENMERKER
U T 44; // EXTENDED PULSE M3 / M4
FN M 108.2; // FM / SPINDLE START BUTTON
NETWORK 8
TITLE = LENZE
U M 104.2; // SUM SFG
UN M 131.7; // AXES IN MOVEMENT
UN M 114.3; // ACTUAL SPEED LESS THAN 20RPM
U M 132.7; // FM KEY SPINDLE STOP
S M 132.1; // SPINDLE STOP ACTIVE
S M 95.7; // SFG
S M 91.7; // AFG, EFG KEY SPINDLE HOLD
U M 106.7; // OPERATION MANUAL AND INC1 UP TO 10000
R M 91.7; // AFG, EFG
U M 110.0; // AUX ON
U M 132.5; // FM BUTTON SPINDLE START
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 132.1; // SPINDLE STOP ACTIVE
R M 95.7; // SFG
```

```
R M 91.7; // AFG, EFG
NETWORK 9
TITLE = LENZE
UN M110.0; // AUX-ON
= M 95.0; // SPINDLE ENABLE
NETWORK 10
TITLE = LENZE SUM SFG
; U M 95.0; // AUX-ON
; U M 95.1; // SPN IN MOTION (SFG)
; U M 95.2; // SFG MELDUNG 7050 NO PART CLOSED
; U M 94.1; // SFG TOOL EXPRESSED
; U M 94.3; // SFG TOOL EXPRESSED
L MW 94; // WORD SFG (SPINDLE ENABLE)
L W # 16 # 0; // H 0
== I; // COMPARISON TO EQUAL
= M 104.2; // SUM SFG
NETWORK 11
TITLE = LENZE MAIN DRIVE ENABLE
U M 104.2; // SUM SFG
UN DB1.DBX 1440.0; // RESET TRIPPED
= M 114.0; // MAIN DRIVE ENABLE
NETWORK 12
TITLE = LENZE SELECT MAIN DRIVE M3
U M 114.0; // HA RELEASE
U (;
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U M 104.3; // SUM NC-STARTVERR.
U M 101.0; // NC START MEMORY
U M 100.6; // M3 MEMORY
O;
U DB20.DBX 192.3; // M3 DYN.
O;
U T 44; // EXTENDED PULSE M3 / M4
UN DB20.DBX 295.4; // SPINDLE START BUTTON
);
S M 114.1
U M 114.1
L S5T # 0S300MS;
SE T 0;
U M 114.1
U T 1;
O T 0;
= DB20.DBX 256.3; // RELEASE M3
S DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R M 100.6; // M3 MEMORY
R M 114.1
NETWORK 13
TITLE = LENZE SELECTION MAIN DRIVE M4
U M 114.0; // HA RELEASE
U (;
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U M 104.3; // SUM NC-STARTVERR.
U M 101.0; // NC START MEMORY
U M 100.7; // M4 MEMORY
O;
U DB20.DBX 192.4; // M4 DYN.
O;
U M 108.2; // FM / T44 M3 / M4
U DB20.DBX 295.4; // SPINDLE START BUTTON
);
S M 114.2
U M 114.2
L S5T # 0S300MS;
```

```
SE T 1;
U M 114.2
U T 0;
O T 1;
= DB20.DBX 256.4; // TRIGGER M4
S DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R M 100.7; // M4 MEMORY
R M 114.2
NETWORK 14
TITLE = LENZE SELECTION MAIN DRIVE M5
U M 108.3; // HM SPINDLE SWITCHED ON
U (;
O M 132.7; // FM KEY SPINDLE STOP
ON M 106.7; // M3 / M4 SPINDLE START ENABLE
);
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB20.DBX 192.5; // M5 DYNAMIC
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB20.DBX 324.2; // DRYRUN ACTIVE
= M 114.5; // M5 HM
NETWORK 15
TITLE = LENZE M3, M4 SAVE AT M0, M1
U M 0.1; // HM M0 / M1 DYNAMIC
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U DB20.DBX 224.3; // M3 STATIC
S M 100.6; // M3 MEMORY
U M 0.1; // HM M0 / M1 DYNAMIC
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U DB20.DBX 224.4; // M4 STATIC
S M 100.7; // M4 MEMORY
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R M 100.6; // M3 MEMORY
R M 100.7; // M4 MEMORY
NETWORK 16
TITLE = LENZE M5 FROM M0, M1, M2, M30 AND M5 HM
U M 0.1; // HM M0 / M1 DYNAMIC
U (;
O DB20.DBX 224.3; // M3 STATIC
O DB20.DBX 224.4; // M4 STATIC
);
O M 114.5; // M5 HM
UN M 101.0; // NC START MEMORY
O DB20.DBX 195.6; // M30 DYN.
O DB20.DBX 192.2; // M2 DYN.
= DB20.DBX 256.5; // REPORT M5
R DB20.DBX 340.0; // SPINDLE ON IN THE CLOCKWISE
R DB20.DBX 340.1; // SPINDLE ONE COUNTERCLOCKWISE
R M 108.3; // HM SPINDLE SWITCHED ON
R M 114.1
R M 114.2
R M 114.4
NETWORK 17
TITLE = LENZE SPINDLE ENABLE
U M 114.0; // HA RELEASE
= DB20.DBX 340.5; // SPINDLE ENABLE
NETWORK 18
TITLE = LENZE MAIN DRIVE IS ON
U M 16.0; // n = 0 RELAY FROM LENZE-FU
ON M 15.7; // HA SERVO-READY
= M 114.3; // ACTUAL SPEED LESS THAN 20RPM
R M 114.6 // HM CONTROLLER ENABLE FOR MAIN DRIVE
```

```
NETWORK 19
TITLE = LENZE CONTROLLER ENABLE FOR MAIN DRIVE
O M 114.1; // REQUIREMENT M3
O M 114.2; // REQUIREMENT M4
= M 90.7; // TAKE AWAY AFG AND EFG
S M 114.4; // HM
U M 114.4; // HM
U M 104.2; // SUM SFG
O
UN M 114.3; // ACTUAL SPEED LESS THAN 20RPM
U M 114.6; // HM CONTROLLER ENABLE FOR MAIN DRIVE
= M 17.1; // INITIAL FLAG CONTROLLER ENABLE MAIN DRIVE
S M 114.6; // HM CONTROLLER ENABLE FOR MAIN DRIVE
END_FUNCTION
FUNCTION FC 4: VOID
NAME: OPERATING MODES
BEGIN
NETWORK 1
TITLE = SUM SPINDLE ON / OFF
UN DB20.DBX 327.2; // REFERENCE OPERATING MODE
UN DB20.DBX 326.4; // AUTOMATIC MODE
UN DB20.DBX 326.2; // OPERATING MODE MDI
UN DB20.DBX 326.1; // EDIT MODE
UN DB20.DBX 326.3; // OPERATING MODE REPOS
UN DB20.DBX 327.4; // PRESET OPERATING MODE
= M 106.7; // M3 / M4 SPINDLE ENABLE IN THE -
// OPERATING MODE JOG AND INC
END_FUNCTION
FUNCTION FC 5: VOID
NAME: AXES READINESS
BEGIN
NETWORK 0
TITLE = RELEASE AXES
U DB1.DBX 1370.0; // 1st PLC LOOP
L S5TIME # 100MS; // 1S
SS T 4; // SWITCH-ON DELAY (STORING)
U M 115.1; // LENZE FU
U T
4; // SWITCH-ON DELAY (STORING)
= M 17.0; // EXIT FLAG ENABLE AXES
NETWORK 1
TITLE = AXES READY FOR OPERATION
UN M 15.3; // X-AXIS SERVO-READY
UN M 15.4; // Y-AXIS SERVO-READY
UN M 15.5; // Z-AXIS SERVO-READY
= M 111.0; // AXES READINESS
NETWORK 2
TITLE = AXES READY FOR OPERATION AFG / EFG
UN M 111.0; // AXES READY TO OPERATE
= M 90.1; // AXES READY FOR OPERATION AFG / EFG
NETWORK 3 8 **********
TITLE = SURVEILLANCE AXES SHARP
U M 110.0; // AUX_ON
L S5TIME # 1S500MS; // 15X0.1S
SE T 5; // START T5 AS SWITCH-ON DELAY.
NETWORK 4
TITLE = ALARM DRIVE X-AXIS DEFECTIVE
U M 15.3; // X-AXIS SERVO-READY
U T 5; // MONITORING AXES SHARP
S DB2.DBX 1.2; // ALARM DRIVE X-AXIS DEFECTIVE
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.2; // ALARM DRIVE X-AXIS DEFECTIVE
NETWORK 5
```

```
TITLE = ALARM DRIVE Y-AXIS DEFECTIVE
U M 15.4; // Y-AXIS SERVO READY
U T 5; // MONITORING AXES SHARP
S DB2.DBX 1.3; // ALARM DRIVE Y-AXIS DEFECTIVE
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.3; // ALARM DRIVE Y-AXIS DEFECTIVE
NETWORK 6
TITLE = ALARM DRIVE Z-AXIS DEFECTIVE
U M 15.5; // Z-AXIS SERVO-READY
U T 5; // MONITORING AXES SHARP
L S5TIME # 500MS;
SE T 31;
U T 31;
S DB2.DBX 1.4; // ALARM DRIVE Z-AXIS DEFECTIVE
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.4; // ALARM DRIVE Z-AXIS DEFECTIVE
NETWORK 6
TITLE = ALARM DRIVE TOOL AXIS DEFECTIVE 8 **************
; U M 15.xxx; // TOOL-AXIS SERVO-READY
; U T 5; // MONITORING AXES SHARP
; S DB2.DBX 1.xxx; // ALARM DRIVE Z-AXIS DEFECTIVE
;
; O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
; O DB1.DBX 1370.3; // RESET KEY PRESSED
; R DB2.DBX 1.4; // ALARM DRIVE Z-AXIS DEFECTIVE
END_FUNCTION
FUNCTION FC 6: VOID
NAME: AXES_JOG
BEGIN
NETWORK 1
TITLE = ACHSEN_JOG ENABLE
U DB20.DBX 340.4; // AXLE ENABLE
= M 112.0; // ACHSEN_JOG ENABLE
NETWORK 2
TITLE = ACHSEN_JOG / STARTVERR.
U DB20.DBX 1.2; // FC JOG_REQUIREMENT
UN M 112.0; // ACHSEN_JOG ENABLE
R DB20.DBX 1.2; // FC JOG_REQUIREMENT
NETWORK
TITLE = JOG A-AXIS / STARTVERL.
U DB20.DBX 1.2; // FC JOG AXES
U (
O DB20.DBX 11.2; // JOG CHANNEL AXIS A IN POS. DIRECTION
O DB20.DBX 13.2; // JOG CHANNEL AXIS A IN NEGATIVE DIRECTION
UN A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
)
R DB20.DBX 1.2; // FC JOG AXES
NETWORK
TITLE = AXES INC / STARTVERR.
ON M 112.0; // ACHSEN_JOG ENABLE
O M 100.2; // FEED SWITCH ON 0%
U DB20.DBX 1.3; // FC INC REQUEST
R DB20.DBX 1.3; // FC INC REQUEST
END_FUNCTION
FUNCTION FC 32: VOID
NAME: AUTOMATICALLY SWITCH TO BA REF
BEGIN
NETWORK
TITLE = PREVENT AUTOMATICALLY SWITCHING TO BA REF WITH THE AUX-ON BUTTON (TO DRIVE FREE
!!)
UN M 121.0
UN M 121.2
```

```
UN M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
U DB1.DBX 1374.4 // AUX ON BUTTON
UN M 200.0 // SET TOOL POSITIONS
S M 121.1
S M 121.0
U DB1.DBX 1374.4 // AUX ON BUTTON
UN M 200.0 // SET TOOL POSITIONS
UN M 121.1
= M 121.2
R M 121.0
UN DB1.DBX 1374.4 // AUX ON BUTTON
R M 121.1
NETWORK
TITLE = AUTOMATICALLY SWITCH TO BA REF
U DB1.DBX 1370.0; // 1st PLC LOOP
S DB100.DBX500.0; // BIT FOR BA JOG
L DB20.DBW 288 // BA SELECTION
L 0
== I.
SPB M0011
L DB20.DBW 288 // BA SELECTION
T DB100.DBW 500
M0011: NOP 0
UN M 52.3 // TOOL ABORTED
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
UN M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
UN M 121.0
; U M 110.0; // AUX-ON
SPBN M0012
L W # 16 # 0400 // SET BIT BA REF
T DB20.DBW 288 // BA SELECTION
SPA M0013
M0012: NOP 0
L DB100.DBW 500
T DB20.DBW 288 // BA SELECTION
M0013: NOP 0
L DB20.DBW 326
L DB20.DBW 288
<> I.
= DB20.DBX 0.0 // BA CHANGE REQUEST
END_FUNCTION
FUNCTION FC 7: VOID
NAME: AXES_REFERENCING
BEGIN
NETWORK 1
TITLE = REFERENCE RELEASE
U M 104.0; // SUM AFG
U M 110.0; // AUX_ON AUTO
UN M 100.2; // FEED SWITCH ON 0%
UN M 52.3 // TOOL ABORTED
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
UN DB3.DBX 7.0; // MESSAGE 7056 ILLEGAL TOOL NUMBER IN THE SETTING DATA
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
= M 120.0; // REFERENCE RELEASE
NETWORK 2
TITLE = APPROACH REFERENCE POINT CANCEL (TRIGGER RESET)
U DB20.DBX 327.2; // REFERENCE OPERATING MODE
U M 15.1; // MACHINE DOOR OPEN
U M 131.7;
// AXES IN MOVEMENT
SPBN M001;
= DB1.DBX 1440.0; // TRIGGER NC RESET
```

```
M001: NOP 0
NETWORK
TITLE = REFPKT.X, Y, Z, APPROACH FROM MST AT THE SAME TIME
U DB20.DBX 830.4; // REFERENCE ALL AXES FROM MST
U DB20.DBX 327.2; // REFERENCE OPERATING MODE
U M 120.0; // REFERENCE RELEASE
UN M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
FP M 121.4 // FM REFPKT.X, Z, APPROACH FROM MST AT THE SAME TIME
U M 121.4 // FM REFPKT.X, Z, AT THE SAME TIME APPROACH FROM MST
SPBN M331;
= DB20.DBX 8.0; // REFERENCE X-AXIS
= DB20.DBX 8.1; // REFERENCE Y-AXIS
= DB20.DBX 8.2; // REFERENCING Z-AXIS
= DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
M331: NOP 0
NETWORK 4
TITLE = REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U M 120.0; // REFERENCE RELEASE
UN M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
U DB20.DBX 8.0; // REFERENCE X-AXIS
U DB20.DBX 8.1; // REFERENCE Y-AXIS
U DB20.DBX 8.2; // REFERENCING Z-AXIS
S M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
FP M 121.5; // FM REFPKT.X, Z, APPROACH AT THE SAME TIME
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0 // TRIGGER NC RESET
O M 122.5; // FM REFERENCE POINT ACTIVE
O M 52.6 // FM REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
R M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
; 8 (((((U M 120.4; // REFERENCE POINT X & Y & Z-AXIS ACTIVE
; U M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
; R DB20.DBX 8.0; // REFERENCE X-AXIS
; R DB20.DBX 8.1; // REFERENCE Y-AXIS
; R DB20.DBX 8.2; // REFERENCING Z-AXIS
; R M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
NETWORK 5
TITLE = DISABLE REFERENCE POINT
U DB1.DBX 134.0; // REFERENCE POINT X-AXIS ACTIVE
U DB1.DBX 134.1; // REFERENCE POINT Y-AXIS ACTIVE
U DB1.DBX 134.2; // REFERENCE POINT Z-AXIS ACTIVE
= M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
O M 120.6 // NEGATIVE FM DOOR OPEN
O M 120.5 // FM EXIT FOR AUXILIARY RELAY DOOR CLOSED
O DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0 // TRIGGER NC RESET
U (
ON M 26.0 // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED
O E 16.4 // REF BERO WZW
)
O(
U DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
U DB10.DBX 100.0 // SET TOOL TURNERS ACTIVATED
O M 121.5; // APPROACH FM REFPKT XYZ AT THE SAME TIME
U M 120.0; // REFERENCE RELEASE
U M 23.6; // Z-AXIS IN THE SAFE AREA
)
O DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
U M 52.5 // TOOL TURNER ACTIVATED
FP M 121.6
U M 121.6
SPBN M111;
= DB20.DBX 348.4; // DISABLE CHANNEL0 REFERENCE POINT OF THE ROUND AXES
= DB25.DBX 348.4; // DISABLE CHANNEL1 REFERENCE POINT OF THE ROUND AXES
```

```
R M 120.2 // TOOL AXIS 0 DEGREES REACHED
R M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
R M 25.0 // TOOL 0 PICK UP DONE
M111: NOP 0
U M 121.5; // APPROACH FM REFPKT XYZ AT THE SAME TIME
; 8 (((((UN M 52.5 // TOOL TURNER ACTIVATED
; UN M 52.7 // ROUND AXLE ACTIVATED
O DB2.DBX 1.2; // ALARM X-AXIS DEFECTIVE
O DB2.DBX 1.3; // ALARM Y-AXIS DEFECTIVE
O DB2.DBX 1.4; // ALARM Z-AXIS DEFECTIVE
O DB2.DBX 1.5; // ALARM TOOL AXIS DEFECTIVE 8 ************
O DB2.DBX 0.0; // ALARM EMERGENCY STOP
FP M 121.7
U M 121.7
SPBN M221;
= DB20.DBX 348.0; // DISABLE CHANNEL0 REFERENCE POINT
= DB25.DBX 348.0; // DISABLE CHANNEL1 REFERENCE POINT
= DB20.DBX 348.4; // DISABLE CHANNEL0 REFERENCE POINT OF THE ROUND AXES
= DB25.DBX 348.4; // DISABLE CHANNEL1 REFERENCE POINT OF THE ROUND AXES
U M 121.5; // APPROACH FM REFPKT XYZ AT THE SAME TIME
S M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
R M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
= DB20.DBX 348.4; // DISABLE CHANNEL0 REFERENCE POINT OF THE ROUND AXES
= DB25.DBX 348.4; // DISABLE CHANNEL1 REFERENCE POINT OF THE ROUND AXES
R M 120.2 // TOOL AXIS 0 DEGREES REACHED
R M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
R M 25.0 // TOOL 0 PICK UP DONE
M221: NOP 0
NETWORK 6
TITLE = DISABLE APPROACH TO REFERENCE
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
UN M 120.0; // REFERENCE RELEASE
R DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
S DB20.DBX 318.7; // NEG. ACKNOWLEDGMENT DNC
NETWORK 7
TITLE = REFERENCE Z-AXIS (FC-CODE)
U M 121.5; // FM REFPKT.X, Z, APPROACH AT THE SAME TIME
U DB20.DBX 8.2; // REFERENCING Z-AXIS
UN M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
O(;
U M 120.0; // REFERENCE RELEASE
UN M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
U DB20.DBX 8.2; // REFERENCING Z-AXIS
);
O(
U M 121.5; // FM REFPKT.X, Z, APPROACH AT THE SAME TIME
UN M 52.5 // TOOL TURNER ACTIVATED
UN M 52.7 // ROUND AXLE ACTIVATED
)
= DB20.DBX 8.2; // REFERENCING Z-AXIS
NETWORK 8
TITLE = FM REFERENZPOINT Z-AXIS ACTIVE
U DB1.DBX 134.2; // REFERENCE POINT Z-AXIS ACTIVE
FP M 120.7; // FM REFERENCE POINT Z-AXIS ACTIVE
NETWORK 9
TITLE = REFERENCE X-AXIS (FC-CODE)
U M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
U M 120.7; // FM REFERENCE POINT Z-AXIS ACTIVE
O(;
U M 120.0; // REFERENCE RELEASE
UN M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
U DB20.DBX 8.0; // REFERENCE X-AXIS
);
```

```
= DB20.DBX 8.0; // REFERENCE X-AXIS
R DB20.DBX 8.2; // REFERENCING Z-AXIS
SPBN M002;
= DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
M002: NOP 0;
NETWORK 10
TITLE = REFERENCE Y-AXIS (FC-CODE)
U M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U M 120.7; // FM REFERENCE POINT Z-AXIS ACTIVE
O(;
U M 120.0; // REFERENCE RELEASE
UN M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
U DB20.DBX 8.1; // REFERENCE Y-AXIS
);
= DB20.DBX 8.1; // REFERENCE Y-AXIS
NETWORK 8
TITLE = FM X, Y, Z REFERENCE POINT ACTIVE
U M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
FP M 120.1; // FM REFERENCE POINT X, Y and Z-AXIS ACTIVE
R M 121.0
U DB1.DBX 134.0; // REFERENCE POINT X-AXIS ACTIVE
U DB1.DBX 134.1; // REFERENCE POINT Y-AXIS ACTIVE
U DB1.DBX 134.2; // REFERENCE POINT Z-AXIS ACTIVE
U (
O DB1.DBX 134.4; // REFERENCE POINT TOOL AXIS ACTIVE
ON M 52.5 // TOOL TURNER ACTIVATED
)
U (
O DB1.DBX 134.5; // REFERENCE POINT A-AXIS ACTIVE
ON M 52.7 // ROUND AXIS ACTIVATED
)
= M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
FP M 52.6 // FM REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
NETWORK 8
TITLE = REFERENCE TOOL
U M 52.5 // TOOL TURNER ACTIVATED
SPBN M003;
NETWORK 10
TITLE = Z-AXIS IN THE SAFE AREA
L DB1.DBD 8; // Z-AXIS IS POSITION
L MD 74; // Z-AXIS TOOL SWIVEL POSITION NO TOOL IN THE SPINDLE
> = R
= M 23.6; // Z-AXIS IN THE SAFE AREA
NETWORK 10
TITLE = REFERENCE TOOL AXIS (FC CODE)
U M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U M 120.7; // FM REFERENCE POINT Z-AXIS ACTIVE
; 8 ((((O (
; U M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
; U M 121.5; // APPROACH FM REFPKT XYZ AT THE SAME TIME
; )
O(
UN M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
U DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
U DB10.DBX 100.0 // SET TOOL TURNERS ACTIVATED
)
U (
O DB10.DBX 100.0 // SET TOOL TURNERS ENABLED
O M 23.6; // Z-AXIS IN THE SAFE AREA
)
U M 120.0; // REFERENCE RELEASE
SPBN M004;
```

```
= DB25.DBX 9.4; // REFERENCING CHANNEL AXIS C
= DB25.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
R M 120.2 // TOOL AXIS 0 DEGREES REACHED
R M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
M004: NOP 0;
NETWORK 10
TITLE = TOOL AXIS REFERENCE FROM AXIS KEY (THE KEY IS ONLY EFFECTIVE IN SETTING MODE !!)
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
U DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
U DB10.DBX 100.0 // SET TOOL TURNERS ACTIVATED
R DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
R DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
NETWORK
TITLE = MOVE TOOL AXIS TO 0 °
U DB1.DBX 134.4; // REFERENCE POINT TOOL AXIS ACTIVE
FP M 122.0 // FM REFERENCE POINT TOOL AXIS ACTIVE
UN DB10.DBX 100.0 // SET TOOL MILL55 ENABLED
O(
U DB10.DBX 100.0 // SET TOOL MILL55 ACTIVATED
U M 200.0 // SET TOOL POSITIONS
)
U M 122.0 // FM REFERENCE POINT TOOL AXIS ACTIVE
UN M 120.2 // TOOL AXIS 0 DEGREES REACHED
UN M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
U M 120.0; // REFERENCE RELEASE
U (
O DB10.DBX 100.0 // SET TOOL TURNERS ENABLED
O M 23.6; // Z-AXIS IN THE SAFE AREA
)
SPBN M006;
S M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
= DB25.DBX 1.4; // SEND NC BLOCK
= DB25.DBX 548.5; // SET EXACT HOLD MODE
= DB25.DBX 549.0; // G1 IS TRIGGERED
= DB25.DBX 549.4; // FEED RATE IN DEGREES / S VALUE IN DBD556
L DB10.DBD 28; // FEED VALUE IN DEGREES / SECONDS
T DB25.DBD 556; // F-VALUE IN M / S OR M / U
S DB25.DBX 21.4; // POSITION REQUEST FOR CHANNEL AXIS C
L + 0.00E0;
T DB25.DBD 70; // POSITION VALUE FOR CHANNEL AXIS C
L 0
T MW 46
M006: NOP 0;
U M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
U DB25.DBX 332.0; // NC BLOCK DONE
SPBN M007;
S M 120.2 // TOOL AXIS 0 DEGREES REACHED
R M 120.3 // HM TOOL AXIS 0 DEGREES REACHED
R DB25.DBX 332.0; // NC BLOCK DONE
U E 4.2; // 12mm BERO TOOL EQUIPPED
S M 46.1 // TOOL 1 PRESENT
M007: NOP 0;
M003: NOP 0;
U M 52.7 // ROUND AXIS ACTIVATED
SPBN M008;
NETWORK 10
TITLE = ROUND AXIS A REFERENCE (FC CODE)
U M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U M 120.7; // FM REFERENCE POINT Z-AXIS ACTIVE
O(;
UN M 121.3; // REFPKT.X, Y, Z, APPROACH AT THE SAME TIME
U DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
U DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
);
```

```
O(
U M 120.4; // REFERENCE POINT X & Y & Z AXIS ACTIVE
U M 121.5; // APPROACH FM REFPKT XYZ AT THE SAME TIME
)
; O(
; U M 120.5 // FM OUTPUT FOR AUXILIARY RELAY DOOR CLOSED
; U DB1.DBX 134.2; // REFERENCE POINT Z-AXIS ACTIVE
; U M 120.0; // REFERENCE RELEASE
; )
U M 120.0; // REFERENCE RELEASE
SPBN M005;
= DB20.DBX 9.2; // REFERENCING CHANNEL AXIS A
= DB20.DBX 1.1; // APPROACH REFERENCE POINT (DEFLECTION)
M005: NOP 0;
M008: NOP 0;
NETWORK 11
TITLE = FM REFERENCE POINT ACTIVE
U M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
FP M 122.5; // FM REFERENCE POINT ACTIVE
UN M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
= M 96.5; // REFERENCE POINT INACTIVE NC_START LOCK.
NETWORK 13
TITLE = MELDUNG 7017 REFERENZP. APPROACH
UN DB3.DBX 6.2; // MESSAGE NO PART TENSIONED
UN DB3.DBX 5.0; // MESSAGE MACHINE DOOR OPEN
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
UN M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
UN DB3.DBX 2.7; // MESSAGE 7023 WAITING TIME MAIN DRIVE
= DB3.DBX 2.1; // 7017 APPROACH REFERENCE POINT
END_FUNCTION
FUNCTION FC 8: VOID
NAME: AUX_ON AC95
BEGIN
NETWORK 1
TITLE = ALARM NOT_AUS AC95
UN M 15.2; // EMERGENCY STOP SWITCH
S DB2.DBX 0.0; // ALARM EMERGENCY STOP
= DB1.DBX 1390.5; // PLC> SURF. EMERGENCY STOP SWITCH
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 0.0; // ALARM EMERGENCY STOP
NETWORK 2
TITLE = MESSAGE MACHINE DOOR OPEN AC95
U M 15.1; // MACHINE DOOR OPEN
UN DB3.DBX 6.2; // NO PART CLAMPED (M7050)
UN DB1.DBX 1370.0; // 1st PLC LOOP
UN DB3.DBX 2.7; // MESSAGE 7023 WAITING TIME MAIN DRIVE
UN DB3.DBX 0.2; // 7002 change tool
= DB3.DBX 5.0; // MACHINE DOOR OPEN (7040)
NETWORK 3
TITLE = 6024 DOOR OPEN ALARM AC95
O M 131.7; // AXES IN MOVEMENT
O M 92.0; // ROUND AXIS IN MOVEMENT
U DB20.DBX 326.4; // AUTO OPERATING MODE
= M 102.0; // HM
U M 131.7; // AXES IN MOVEMENT
U DB20.DBX 327.2; // REFERENCE OPERATING MODE
= M 102.1; // HM
U DB20.DBX 324.0; // PROGRAM RUNNING
UN DB20.DBX 324.1; // STOP STATE
U DB20.DBX 326.4; // AUTO OPERATING MODE
```

```
=·M·102.2;·//·HM
UN·M·114.3;·//·ACTUAL·SPEED·LESS·THAN·20RPM
=·M·102.3;·//·HM
O·M·102.0;·//·HM
O·M·102.1;·//·HM
O·M·102.2;·//·HM
O·M·102.3;·//·HM
=·M·110.2;·//·HM·DOOR·ALARM
U·M·110.2;·//·HM·DOOR·ALARM
U·M·15.1;·//·MACHINE·DOOR·OPEN
S·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
O·DB1.DBX·1370.2;·//·ACKNOWLEDGMENT·KEY·PRESSED
O·DB1.DBX·1370.3;·//·RESET·KEY·PRESSED
R·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
NETWORK·4
TITLE·=·SUM·ALARMS·1·AC95
L·DB2.DBW·0;·//·WORD·ALARMS·1
L·W·#·16·#·0;
<>·I;
=·M·105.0;·//·SUM·ALARMS1
NETWORK·5
TITLE·=·SUM·ALARMS·2·AC95
L·DB2.DBW·2;·//·WORD·ALARMS·2
L·W·#·16·#·0;
<>·I;
=·M·105.1;·//·SUM·ALARMS·2
NETWORK·6
TITLE·=·SUM·THERMAL·ALARMS·AC95
L·DB2.DBW·4;·//·BYTE·/·THERM.·ALARMS
L·W·#·16·#·0;
<>·I;
=·M·105.2;·//·SUM·THERM.·ALARMS
NETWORK·7
TITLE·=·SELECTION·AUX_ON·AC95
U·DB1.DBX·1370.0;·//·1st·PLC·LOOP
S·M·110.1;·//·AUX_ON·ON
U·M·110.1;·//·AUX_ON·ON
=·DB1.DBX·1390.2;·//·PLC>·SURFACE·AUX-ON
S·M·110.0;·//·AUX_ON·AUTO
S·M·110.3;·//·AUX-ON·MANUAL
NETWORK·8
TITLE·=·DESELECT·AUX_ON·AC95
O·M·105.0;·//·SUM·ALARMS·1
O·M·105.1;·//·SUM·ALARMS·2
O·M·105.2;·//·SUM·THERM.·ALARMS
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.3;·//·AUX-ON·MANUAL
UN·M·110.3;·//·AUX-ON·MANUAL
O·M·15.1;·//·MACHINE·DOOR·OPEN
O·M·18.3;·//·EXIT·FLAG·DOOR·OPEN
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.0;·//·AUX-ON·AUTO
NETWORK·9
TITLE·=·HW·CHECK·DOOR·OPEN·AC95·(ALARM·6009)
U·M·15.1;·//·MACHINE·DOOR·OPEN
L·S5TIME·#·1S;·//·10X0.1S
SE·T·6;·//·T6·SWITCH-ON·DELAYED
U·T·6;·//·T6
U·M·15.0;·//·MACHINE·DOOR·CLOSED·(MAIN·MOTOR·CONTACTOR·ON)
S·DB2.DBX·1.1;·//·HW·ERROR·SAFETY·CIRCUIT
NETWORK·10
TITLE·=·HW·CHECK·CLOSE·DOOR·AC95
UN·DB1.DBX·1370.0;·//·1st·PLC·LOOP
UN·M·15.1;·//·MACHINE·DOOR·OPEN
```

```
U M 15.2; // EMERGENCY STOP SWITCH
U M 15.6; // WHEEL COVER CLOSED
L S5TIME # 1S; // 10X0.1S
SE T 11; // T11 SWITCH-ON TV.
U T 11; // T11
UN M 15.0;// MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
S DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
END_FUNCTION
FUNCTION FC 9: VOID
NAME: AUX_ON ACC
BEGIN
NETWORK 1
TITLE = ENABLE DIFFERENTIAL LINE DRIVER ON ACC MOTHERBOARD
U M 110.3; // AUX-ON MANUAL
S A 3.7; // ENABLE DIFFERENTIAL LINE DRIVER CYCLES FOR SM
UN M 110.3; // AUX-ON MANUAL
L S5TIME # 1S; // 10X0.1S
SE T 10;
U T 10;
R A 3.7; // ENABLE DIFFERENTIAL LINE DRIVER CYCLES FOR SM
NETWORK 1
TITLE = ALARM NOT_AUS ACC
UN M 15.2; // EMERGENCY STOP SWITCH
S DB2.DBX 0.0; // ALARM EMERGENCY STOP
= DB1.DBX 1390.5; // PLC> SURF. EMERGENCY STOP SWITCH
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 0.0; // ALARM EMERGENCY STOP
NETWORK 2
TITLE = MESSAGE MACHINE DOOR OPEN ACC
U M 15.1; // MACHINE DOOR OPEN
UN DB3.DBX 6.2; // NO PART CLAMPED (M7050)
UN DB1.DBX 1370.0; // 1st PLC LOOP
UN DB3.DBX 6.7; // MESSAGE 7055 OPEN TOOL CLAMPING SYSTEM
UN DB3.DBX 7.0; // MESSAGE 7056 ILLEGAL TOOL NUMBER IN THE SETTING DATA
UN DB3.DBX 7.1; // MESSAGE 7057 TOOL HOLDER OCCUPIED
UN DB3.DBX 7.2; // MESSAGE 7058 AXES RELEASE
UN DB3.DBX 2.7; // MESSAGE 7023 WAITING TIME MAIN DRIVE
UN DB3.DBX 0.2; // 7002 change tool
= DB3.DBX 5.0; // MACHINE DOOR OPEN (7040)
NETWORK
TITLE = AXES IN MOTION
L DB1.DBB 1358; // AXES IN MOVEMENT
L B # 16 # 0; // LOAD CONSTANT HEX 0
<> I; // COMPARE TO INEQUAL
= M 131.7; // AXES IN MOVEMENT
NETWORK 3
TITLE = 6024 ALARM DOOR OPEN ACC
O M 131.7; // AXES IN MOVEMENT
O M 92.0; // ROUND AXIS IN MOVEMENT
U DB20.DBX 326.4; // AUTO OPERATING MODE
= M 102.0; // HM
U M 131.7; // AXES IN MOVEMENT
U DB20.DBX 327.2; // REFERENCE OPERATING MODE
= M 102.1; // HM
U DB20.DBX 324.0; // PROGRAM RUNNING
UN DB20.DBX 324.1; // STOP STATE
U (
O DB20.DBX 326.4; // AUTO OPERATING MODE
O DB20.DBX 326.2; // OPERATING MODE MDI
```

```
)
=·M·102.2;·//·HM
UN·M·114.3;·//·ACTUAL·SPEED·LESS·THAN·20RPM
=·M·102.3;·//·HM
O·M·102.0;·//·HM
O·M·102.1;·//·HM
O·M·102.2;·//·HM
O·M·102.3;·//·HM
=·M·110.2;·//·HM·DOOR·ALARM
U·M·110.2;·//·HM·DOOR·ALARM
U·M·15.1;·//·MACHINE·DOOR·OPEN
S·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
O·DB1.DBX·1370.2;·//·ACKNOWLEDGMENT·KEY·PRESSED
O·DB1.DBX·1370.3;·//·RESET·KEY·PRESSED
R·DB2.DBX·3.0;·//·6024·ALARM·DOOR·OPEN
NETWORK·4
TITLE·=·SUM·ALARMS·1·ACC
L·DB2.DBW·0;·//·WORD·ALARMS·1
L·W·#·16·#·0;
<>·I;
=·M·105.0;·//·SUM·ALARMS1
NETWORK·5
TITLE·=·SUM·ALARMS·2·ACC
L·DB2.DBW·2;·//·WORD·ALARMS·2
L·W·#·16·#·0;
<>·I;
=·M·105.1;·//·SUM·ALARMS·2
NETWORK·5
TITLE·=·SUM·ALARMS·3·ACC
L·DB2.DBW·3;·//·WORD·ALARMS·3
L·W·#·16·#·0;
<>·I;
=·M·105.3;·//·SUM·ALARMS·3
NETWORK·6
TITLE·=·SUM·THERMAL·ALARMS·ACC
L·DB2.DBW·4;·//·BYTE·/·THERM.·ALARMS
L·W·#·16·#·0;
<>·I;
=·M·105.2;·//·SUM·THERM.·ALARMS
NETWORK·7
TITLE·=·SELECTION·AUX_ON·ACC
U·DB1.DBX·1370.0;·//·1st·PLC·LOOP
S·M·110.1;·//·AUX_ON·ON
U·M·110.1;·//·AUX_ON·ON
=·DB1.DBX·1390.2;·//·PLC>·SURFACE·AUX-ON
S·M·110.0;·//·AUX_ON·AUTO
S·M·110.3;·//·AUX-ON·MANUAL
NETWORK·8
TITLE·=·DESELECT·AUX_ON·ACC
O·M·105.0;·//·SUM·ALARMS·1
O·M·105.1;·//·SUM·ALARMS·2
O·M·105.3;·//·SUM·ALARMS·3
O·M·105.2;·//·SUM·THERM.·ALARMS
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.3;·//·AUX-ON·MANUAL
UN·M·110.3;·//·AUX-ON·MANUAL
ON·A·3.4;·//·EXIT·FOR·AUXILIARY·RELAY·DOOR·CLOSED
O·M·18.3;·//·EXIT·FLAG·DOOR·OPEN
O·DB1.DBX·1366.3;·//·ALARM·ACTIVE
R·M·110.0;·//·AUX-ON·AUTO
END_FUNCTION
FUNCTION·FC·13:·VOID
NAME:·NC-STARTVERR.·AND·CONTROL·BUTTONS
BEGIN
```

```
NETWORK
TITLE = FM CYCLE START BUTTON FROM CONTROL PANEL AND RAFITAS BUTTON
O DB20.DBX 831.5 // CYCLE START KEY FROM CONTROL PANEL
FP M 105.5; // FM CYCLE START BUTTON FROM CONTROL PANEL
U M 105.5; // FM CYCLE START BUTTON FROM CONTROL PANEL
= DB20.DBX 3.6; // NC START REQUEST
NETWORK
TITLE = FM NC STOP BUTTON FROM CONTROL PANEL or HM M0 / M1 DYNAMIC
O DB20.DBX 831.4 // NC STOP KEY FROM CONTROL PANEL
FP M 105.6; // FM NC STOP BUTTON FROM THE CONTROL PANEL
O M 105.6; // FM NC STOP BUTTON FROM THE CONTROL PANEL
O M 0.1; // HM M0 / M1 DYNAMIC
O DB20.DBX 0.1; // NC STOP REQUEST
= DB20.DBX 0.1; // NC STOP REQUEST
NETWORK
TITLE = FM RESET BUTTON FROM THE CONTROL PANEL
O DB20.DBX 828.6 // RESET BUTTON FROM CONTROL PANEL
FP M 105.7; // FM RESET BUTTON FROM CONTROL PANEL
O M 105.7; // FM RESET BUTTON FROM THE CONTROL PANEL
O DB20.DBX 4.0; // RESET REQUEST
= DB20.DBX 4.0; // RESET REQUIREMENT
NETWORK 1
TITLE = AUX_ON / WORT NC_START VERR.
UN M 96.2; // WAITING TIME MAIN DRIVE NC_START VERR.
UN M 96.3; // OUTPUT FOR AUXILIARY RELAY DOOR CLOSED NC_START LOCK.
UN M 96.4; // ENABLE SM MODUL B NC_START VERR.
UN M 96.6; // Message target quantity reached NC_START VERR.
UN M 96.7; // SERVO READY MAIN DRIVE NC_START VERR.
UN M 97.2; // MESSAGE 7050 NO PART CLAMPED NC_START LOCK.
UN M 97.3; // SPN IN MOVEMENT NC_START LOCK.
UN M 97.4; // PART.IN MOVEMENT NC_START LOCK.
= M 104.4; // SUM NC_START LOCKED WITHOUT REFERENCE POINT INACTIVE
UN M 96.5; // REFERENCE POINT INACTIVE NC_START LOCK.
UN M 96.0; // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED NC_START LOCK.
UN M 96.1; // TOOL ENABLE NC_START VERR.
U M 104.4; // SUM NC_START LOCKED WITHOUT REFERENCE POINT INACTIVE
= M 104.3; // SUM NC_START VERR.
NETWORK 3
O M 100.6; // M3 MEMORY
O M 100.7; // M4 MEMORY
UN DB10.DBX 1.6; // SPINDLE START AFTER M0
U DB20.DBX 0.2; // FC NC-START
U M 104.3; // SUM NC_STARTVERR.
S M 101.0; // NC START MEMORY
NETWORK
TITLE = AUTOMATIC AND MDI OPERATING MODE
; UN DB20.DBX 326.2; // OPERATING MODE MDI
; UN DB20.DBX 326.4; // AUTOMATIC MODE
UN DB20.DBX 326.0; // JOG MODE
UN DB20.DBX 326.1; // EDIT MODE
UN DB20.DBX 326.3; // OPERATING MODE REPOS
UN DB20.DBX 326.5; // OPERATING MODE INC 1
UN DB20.DBX 326.6; // OPERATING MODE INC 10
UN DB20.DBX 326.7; // OPERATING MODE INC 100
UN DB20.DBX 327.0; // OPERATING MODE INC 1000
UN DB20.DBX 327.1; // OPERATING MODE INC 10000
UN DB20.DBX 327.2; // REFERENCE OPERATING MODE
UN DB20.DBX 327.3; // OPERATING MODE INC VAR
UN DB20.DBX 327.4; // PRESET OPERATING MODE
O DB1.DBX 1402.5; // HEIDENHAIN TNC355 ACTIVE
= M 103.0; // AUTOMATIC AND MDI OPERATING MODE
NETWORK 4
TITLE = NC_START / STARTVERR.
ON M 103.0; // AUTOMATIC AND MDI OPERATING MODE
```

```
ON M 104.3; // SUM NC START VERR.
O M 101.0; // NC START MEMORY
O DB1.DBX 1366.3; // ALARM ACTIVE
U DB20.DBX 0.2; // FC NC_START
R DB20.DBX 0.2; // FC NC_START
= DB20.DBX 319.0; // NEG. ACKNOWLEDGMENT DNC
END_FUNCTION
FUNCTION FC 10: VOID
NAME: AT_PROGRAM_ENDE_RESET_ODER_NEUSTART
BEGIN
NETWORK 1
TITLE = PROGRAM END TO NC
O M 10.1; // HM
UN DB10.DBX 1.0; // SPS-MSD (CONTINUOUS RUN)
R M 10.1; // HM
= DB20.DBX 348.1; // PROGRAM RUNNING WILL BE RESET
NETWORK 2
TITLE = PROGRAM END AND RESTART (CONTINUOUS RUN) ON NC
O M 10.1; // HM
U DB10.DBX 1.0; // SPS-MSD (CONTINUOUS RUN)
R M 10.1; // HM
= DB20.DBX 348.2; // PROGRAM RUNNING WILL BE RESET AND STARTED
NETWORK 3
TITLE = ACTUAL SPEED LESS THAN 20RPM
O DB20.DBX 192.2; // M2 DYN.
O DB20.DBX 195.6; // M30 DYN.
S M 10.0; // HM
U M 10.0; // HM
U M 114.3; // ACTUAL SPEED LESS THAN 20RPM
S M 10.1; // HM
R M 10.0; // HM
NETWORK 3
TITLE = M2 and M30 FEEDBACK FROM M2, M30 AND RESET
O DB20.DBX 348.1; // PROGRAM RUNNING WILL BE RESET
O DB20.DBX 348.2; // PROGRAM RUNNING WILL BE RESET AND STARTED
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 10.0; // HM
R M 10.1; // HM
= DB20.DBX 259.6; // REPORT M30
= DB20.DBX 256.2; // REPORT M2
END_FUNCTION
FUNCTION FC 11: VOID
NAME: NC_START_UND_NC_STOP_VON_M0_ODER_M1
BEGIN
NETWORK 2
TITLE = FC NC START
UN DB10.DBX 1.6; // Start of the spindle after M0
U M 101.0; // NC start memory
U (;
O DB20.DBX 224.3; // M3 Static
O DB20.DBX 224.4; // M4 Static
);
; O E 2.4 // External CYCLE Start 8 **** foot switch for Andi's PCM50
O M 150.1; // FM ROBOTICS INTERFACE NC START
S DB20.DBX 0.2; // FC NC-START
U DB20.DBX 0.2; // FC NC-START
R M 101.0; // NC start memory
END_FUNCTION
FUNCTION FC 12: VOID
NAME: AFG_EFG
BEGIN
NETWORK 1
TITLE = FM KEY FEED START
```

```
U DB20.DBX 295.2; // FEED START BUTTON
UN DB20.DBX 295.1; // FEED HOLD KEY
UN M 200.0 // SET TOOL POSITIONS
FP M 133.5; // FM KEY FEED START
NETWORK 2
TITLE = FM KEY FEED HOLD
U DB20.DBX 295.1; // FEED HOLD KEY
UN DB20.DBX 295.2; // FEED START BUTTON
UN M 200.0 // SET TOOL POSITIONS
FP M 133.7; // FM KEY FEED STOP
NETWORK
TITLE = FEED STOP / START ENABLE
U M 104.0; // SUM AFG
= M 133.0; // FEED STOP / START ENABLE
NETWORK 3
TITLE = FEED STOP ACTIVE
O DB20.DBX 326.4; // AUTOMATIC MODE
O DB20.DBX 326.2; // OPERATING MODE MDI
O DB20.DBX 327.2; // REFERENCE OPERATING MODE
U (
U M 133.0; // FEED STOP / START ENABLE
U M 133.7; // FM KEY FEED STOP
UN M 15.1; // MACHINE DOOR OPEN
U M 131.7; // AXES IN MOVEMENT
)
S M 91.6; // AFG, EFG FEED STOP ACTIVE
U M 133.5; // FM BUTTON PREVIEW
B START
UN M 132.1; // SPINDLE STOP ACTIVE
UN M 15.1; // MACHINE DOOR OPEN
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R M 91.6; // AFG, EFG
NETWORK 4
TITLE = SUM MELDUNGEN AFG / EFG
L DB3.DBW 0; // WORD / MESSAGES AFG / EFG
L W # 16 # 0; // LOAD CONSTANT HEX 0
<> I; // COMPARE TO INEQUAL
= M 91.0; // SUM MESSAGES AFG / EFG
NETWORK 5
TITLE = SUM AFG K0
UN M 90.1; // AXES READY FOR OPERATION AFG / EFG
UN M 90.4; // SPM ON THE MOVE
UN M 90.5; // AFG / EFG T-WORD IS VALID
UN M 90.7; // TAKE AWAY AFG AND EFG
UN M 91.0; // SUM MESSAGES AFG / EFG
UN M 91.2; // AFG MELDUNG 7050 NO PART CLAMPED
UN M 91.5; // VICE MOV. ACTIVE AFG / EFG
UN M 91.6; // AFG, EFG FEED STOP ACTIVE
UN M 91.7; // AFG, EFG KEY SPINDLE HOLD
= M 104.0; // SUM AFG
NETWORK 5
TITLE = SUM EFG K0
UN M 90.1; // AXES READY FOR OPERATION AFG / EFG
UN M 90.2; // ABSOLUTE AXIS 4 (TOOL) 0 DEGREES REACHED AFG / EFG
UN M 90.4; // SPM ON THE MOVE
UN M 90.5; // AFG / EFG T-WORD IS VALID
UN M 90.7; // TAKE AWAY AFG AND EFG
UN M 91.0; // SUM MESSAGES AFG / EFG
UN M 91.2; // AFG MELDUNG 7050 NO PART CLAMPED
UN M 91.5; // VICE MOV. ACTIVE AFG / EFG
UN M 91.6; // AFG, EFG FEED STOP ACTIVE
UN M 91.7; // AFG, EFG KEY SPINDLE HOLD
= M 104.1; // SUM EFG
```

```
NETWORK 6
TITLE = AFG / EFG
UN DB20.DBX 327.2; // REFERENCE OPERATING MODE
UN DB20.DBX 326.4; // AUTOMATIC MODE
UN DB20.DBX 326.2; // OPERATING MODE MDI
UN DB20.DBX 326.1; // EDIT MODE
UN DB20.DBX 326.3; // OPERATING MODE REPOS
UN DB20.DBX 327.4; // PRESET OPERATING MODE
U M 110.3; // AUX-ON MANUAL
O;
UN DB20.DBX 326.0; // JOG MODE
UN DB20.DBX 326.1; // EDIT MODE
UN DB20.DBX 326.3; // OPERATING MODE REPOS
UN DB20.DBX 327.4; // PRESET OPERATING MODE
U M 110.0; // AUX-ON AUTO
= M 110.7; // HM OPERATING MODES
U M 110.7; // HM OPERATING MODES
U M 104.0; // SUM AFG
= DB20.DBX 340.4; // AXIS ENABLE K0
U M 110.7; // HM OPERATING MODES
U M 104.1; // SUM EFG
= DB20.DBX 340.3; // READ-IN ENABLE K0
NETWORK 5
TITLE = AFG K1
UN M 90.1; // AXES READY FOR OPERATION AFG / EFG
UN M 90.3; // ENABLE SM MODUL B AFG / EFG
UN M 90.4; // SPM ON THE MOVE
UN M 90.7; // TAKE AWAY AFG AND EFG
UN M 91.0; // SUM MESSAGES AFG / EFG
UN M 91.2; // AFG MELDUNG 7050 NO PART CLAMPED
UN M 91.5; // VICE MOV. ACTIVE AFG / EFG
UN M 91.6; // AFG, EFG FEED STOP ACTIVE
UN M 91.7; // AFG, EFG KEY SPINDLE HOLD
U M 110.7; // HM OPERATING MODES
= DB25.DBX 340.4; // AXLE ENABLE K1
NETWORK 6
TITLE = EFG K1
UN M 90.1; // AXES READY FOR OPERATION AFG / EFG
UN M 90.3; // ENABLE SM MODUL B AFG / EFG
UN M 90.4; // SPM ON THE MOVE
UN M 90.7; // TAKE AWAY AFG AND EFG
UN M 91.0; // SUM MESSAGES AFG / EFG
UN M 91.2; // AFG MELDUNG 7050 NO PART CLAMPED
UN M 91.5; // VICE MOV. ACTIVE AFG / EFG
UN M 91.6; // AFG, EFG FEED STOP ACTIVE
UN M 91.7; // AFG, EFG KEY SPINDLE HOLD
U M 110.7; // HM OPERATING MODES
= DB25.DBX 340.3; // READ-IN ENABLE K1
NETWORK
TITLE = enables for Repos operating mode
U DB20.DBX 324.0; // PROGRAM RUNNING
U DB20.DBX 324.1; // PROGRAM STOPPED
U DB20.DBX 326.3; // OPERATING MODE REPOS
SPBN M1302;
= DB25.DBX 340.3; // READ-IN ENABLE K1
= DB25.DBX 340.4; // AXLE ENABLE K1
M1302: NOP 0;
END_FUNCTION
FUNCTION FC 14: VOID
NAME: ALARM STATUS
BEGIN
NETWORK 1
TITLE =
U DB1.DBX 1366.3; // ALARM ACTIVE
```

```
= M 19.7; // EXIT FLAG ROBOTICS ALARM OUTPUT
END_FUNCTION
FUNCTION FC 16: VOID
NAME: PLC_OBERFLAECHEN_SIGNALE
BEGIN
NETWORK 1
U DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
= DB1.DBX 1418.0; // AUT. DOOR
O DB10.DBX 75.4; // Activate pneumatic vice
O DB10.DBX 75.1; // Activate the electric vice
= DB20.DBX 382.1; // Clamping device available
U DB10.DBX 75.3;
= DB20.DBX 382.4; // BLOW DEVICE
U DB10.DBX 75.6;
= DB20.DBX 382.5; // PARTIAL APPARATUS
END_FUNCTION
FUNCTION FC 17: VOID
NAME: AUTOMATIC DOOR
BEGIN
NETWORK 1
TITLE = RELEASE OPEN THE DOOR
; UN M 110.2; // HM DOOR ALARM
NETWORK 1
TITLE = FM PC KEY DOOR
U DB1.DBX 1374.2; // DOOR BUTTON
U M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
UN M 139.5; // HM OPEN THE DOOR
UN M 110.2; // HM DOOR ALARM
S M 139.2; // HM CLOSE THE DOOR BY PC KEY
R M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
UN DB1.DBX 1374.2; // DOOR BUTTON
R M 139.2; // HM CLOSE THE DOOR BY PC KEY
NETWORK 4
TITLE = REQUEST DOOR OPEN
U DB1.DBX 1374.2; // DOOR BUTTON
UN M 139.2; // HM CLOSE THE DOOR BY PC KEY
O;
U DB1.DBX 1370.0; // 1st PLC LOOP
UN M 18.3; // EXIT FLAG DOOR OPEN
UN M 18.4; // EXIT FLAG DOOR CLOSED
U M 15.1; // MACHINE DOOR OPEN
U E 4.4; // DOOR OPEN, AUTOMATIC DOOR
; O DB1.DBX 1382.0; // DNC REQUIREMENT DOOR OPEN
O M 138.1; // HM MACHINE KEYBOARD DOOR OPEN
O M 149.1; // HM ROBOT INTERFACE
= M 139.5; // HM OPEN THE DOOR
O M 0.1; // HM M0 / M1 DYNAMIC
O DB20.DBX 195.6; // M30 DYNAMIC
O DB20.DBX 192.2; // M2 DYNAMIC
O DB1.DBX 1382.0; // DNC REQUIREMENT DOOR OPEN
UN DB10.DBX 1.0; // PLC-MSD CONTINUOUS RUN ACTIVE
S M 139.3; // OPEN MARKER DOOR
NETWORK 5
TITLE = REQUEST DOOR CLOSED
U DB1.DBX 1382.1; // DNC REQUIREMENT DOOR CLOSED
S M 136.1 // HM DNC REQUIREMENT DOOR CLOSED
UN M 15.1; // MACHINE DOOR OPEN
O DB1.DBX 1382.0; // DNC REQUIREMENT DOOR OPEN
O DB1.DBX 1382.2; // DNC REQUEST DOOR STOP
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
R M 136.1 // HM DNC REQUIREMENT DOOR CLOSED
U M 138.2; // HM MACHINE KEYBOARD DOOR CLOSED
U M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
```

```
S M 139.7
R M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
UN M 138.2; // HM MACHINE KEYBOARD DOOR CLOSED
R M 139.7
O M 139.2; // HM CLOSE THE DOOR BY PC KEY
O M 136.1 // HM DNC REQUIREMENT DOOR CLOSED
O M 139.7
O M 149.0; // HM ROBOT INTERFACE
; O(;
; U DB1.DBX 1370.0; // 1st PLC LOOP
; UN M 18.3; // EXIT FLAG DOOR OPEN
; UN M 18.4; // EXIT FLAG DOOR CLOSED
; UN M 15.1; // MACHINE DOOR OPEN
;; U M 15.0; // MACHINE DOOR CLOSED (MAIN MOTOR CONTACTOR ON)
; UN E 4.4; // DOOR OPEN, AUTOMATIC DOOR
; );
= M 139.4; // FLAG CLOSE THE DOOR
NETWORK 6
TITLE = ABORT CONDITION
O(
U M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
UN E 4.4; // DOOR OPEN, AUTOMATIC DOOR
)
O(
UN M 15.1; // MACHINE DOOR OPEN
U E 4.4; // DOOR OPEN, AUTOMATIC DOOR
)
L S5TIME # 1S; // 1 p
SE T 27; // SWITCH ON DELAY
U T 27;
S DB2.DBX 3.3; // DOOR SWITCH DEF. (ALARM 6027)
; R M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
R M 110.1; // AUX-ON ON
R M 110.0; // AUX-ON AUTO
R M 110.3; // AUX-ON MANUAL
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 3.3; // DOOR SWITCH DEF.
O DB1.DBX 1382.2; // DNC REQUEST DOOR STOP
O DB2.DBX 3.4; // DOOR MONITORING PERIOD.
ON M 110.1; // AUX-ON ON
ON M 15.2; // EMERGENCY STOP SWITCH
R M 136.1 // HM DNC REQUIREMENT DOOR CLOSED
R M 18.3; // EXIT FLAG DOOR OPEN
R M 18.4; // EXIT FLAG DOOR CLOSED
R M 139.2; // HM CLOSE THE DOOR BY PC KEY
R M 139.3; // OPEN MARKER DOOR
NETWORK 7
TITLE = OPEN THE DOOR
O M 139.3; // OPEN MARKER DOOR
O M 139.5; // OPEN MARKER DOOR
O M 400.0 // OPEN MARKER DOOR
UN M 110.2; // HM DOOR ALARM
O(
ON E 2.1; // S1 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
ON E 2.5; // S2 DOOR SWITCH (0 SIGNAL WHEN THE DOOR IS CLOSED)
U M 18.3; // EXIT FLAG DOOR OPEN
)
S M 18.3; // EXIT FLAG DOOR OPEN
R M 18.4; // EXIT FLAG DOOR CLOSED
R M 139.1; // EXIT FLAG DOOR CLOSED
O M 18.3; // EXIT FLAG DOOR OPEN
O DB1.DBX 1370.0; // 1st PLC LOOP
U E 4.4; // DOOR OPEN, AUTOMATIC DOOR
```

```
S M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
U M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
S M 18.3; // EXIT FLAG DOOR OPEN
R M 139.3; // OPEN MARKER DOOR
U M 18.3; // EXIT FLAG DOOR OPEN
UN E 4.4; // DOOR OPEN, AUTOMATIC DOOR
= M 139.0; // DOOR IN MOVEMENT
L S5TIME # 10S; // 10 SECONDS
SE T 20; // START T20 SWITCH-ON DELAY.
NETWORK 8
TITLE = CLOSE THE DOOR
U M 139.4; // FLAG CLOSE THE DOOR
UN M 90.4; // SPM ON THE MOVE
O M 400.1 // KEEPER CLOSE THE DOOR
= M 18.4; // EXIT FLAG DOOR CLOSED
R M 18.3; // EXIT FLAG DOOR OPEN
R M 139.4; // FLAG CLOSE THE DOOR
R M 139.6 // HM DOOR OPEN FROM EXIT FLAG DOOR OPEN
U M 18.4; // EXIT FLAG DOOR CLOSED
U M 15.1; // MACHINE DOOR OPEN
= M 139.0; // DOOR IN MOVEMENT
L S5TIME # 10S; // 10 SECONDS
SE T 21; // START T21 SWITCH-ON DELAY.
U M 18.4; // EXIT FLAG DOOR CLOSED
UN M 15.1; // MACHINE DOOR OPEN
O M 120.5 // FM EXIT FOR AUXILIARY RELAY DOOR CLOSED
S M 139.1; // EXIT FLAG DOOR CLOSED
U M 139.1; // EXIT FLAG DOOR CLOSED
S M 18.4; // EXIT FLAG DOOR CLOSED
NETWORK 9
O T 20; // T20
O T 21; // T21
UN DB2.DBX 3.3; // DOOR SHEET
OLD DEF. (ALARM 6027)
S DB2.DBX 3.4; // DOOR TIME ABGEL. (ALARM 6028)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 3.4;
NETWORK 10
TITLE = DNC STATUS REPORTING DOOR
UN M 15.1; // MACHINE DOOR OPEN
UN E 4.4; // DOOR OPEN, AUTOMATIC DOOR
U M 104.4; // SUM NC_START LOCKED WITHOUT REFERENCE POINT INACTIVE
= M 148.0; // HM ROBOT INTERFACE
= DB1.DBX 1390.1; // PLC> SURF. DOOR CLOSED
U M 15.1; // MACHINE DOOR OPEN
U E 4.4; // DOOR OPEN, AUTOMATIC DOOR
= M 148.1; // HM ROBOT INTERFACE
= DB1.DBX 1390.0; // PLC> SURF. DOOR OPEN
U DB1.DBX 1382.0; // DNC DOOR OPEN
UN M 18.3; // EXIT FLAG DOOR OPEN
S DB1.DBX 1398.0; // NEG. ACKNOWLEDGMENT DNC
U DB1.DBX 1382.1; // DNC DOOR CLOSED
UN M 18.4; // EXIT FLAG DOOR CLOSED
S DB1.DBX 1398.0; // NEG. ACKNOWLEDGMENT DNC
END_FUNCTION
FUNCTION FC 18: VOID
NAME: EL_VICE
BEGIN
NETWORK 1
TITLE = SPN SPANNEN
U (;
ON DB20.DBX 324.0; // PROGRAM RUNNING
O DB20.DBX 324.1; // STATE STOP
```

```
);
U DB20.DBX 294.4; // PC KEY PINOL FORWARD
O DB20.DBX 195.2; // CLAMP M26 SPM (DYN.)
O M 149.3; // ROBOTICS / FM VICE CLOSED
O DB20.DBX 302.2; // CLAMP DNC INTRFACE SPM
U M 140.2; // SPN ENABLE
S M 140.0; // CLAMPING
= DB20.DBX 259.2; // TRIP M26
R M 140.1; // RELAX IN SPN
NETWORK 2
TITLE = SPN RELAX
U (;
ON DB20.DBX 324.0; // PROGRAM RUNNING
O DB20.DBX 324.1; // STATE STOP
);
U DB20.DBX 294.3; // PC BUTTON QUILL BACK
O DB20.DBX 195.1; // M25 SPM RELAX (DYN.)
O M 149.2; // ROBOTICS / FM VICE ON
O DB20.DBX 302.1; // RELAX DNC INTERFACE SPM
U M 140.2; // SPN ENABLE
S M 140.1; // RELAX IN SPN
= DB20.DBX 259.1; // TRIP M25
R M 140.0; // CLAMPING
NETWORK 3
TITLE = RELEASE SPN
U M 110.3; // AUX-ON MANUAL
U M 114.3; // ACTUAL SPEED LESS THAN 20RPM
UN M 131.7; // AXES IN MOVEMENT
UN M 106.6; // EDIT MODE OPERATING MODE
= M 140.2; // SPN ENABLE
NETWORK 4
TITLE = SPN ON THE MOVE
U M 140.0; // CLAMPING
UN E 4.5; // TENSIONED
O;
U M 140.1; // RELAX IN SPN
UN E 4.1; // REAR SPN
= M 90.4; // SPN IN MOTION (AFG, EFG)
= M 95.1; // SPN IN MOTION (SFG)
= M 97.3; // SPN IN MOVEMENT (NC START LOCK)
L S5TIME # 30S; // 30S
SE T 24;
UN DB2.DBX 3.6; // NO PART CLAMPED (ALARM 6030)
U T 24;
S DB2.DBX 2.3; // SPN TIME MONITOR. (ALARM 6019)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 2.3; // SPN TIME MONITOR. (ALARM 6019)
NETWORK 5
TITLE = MELDUNG 7050 NO PART CLOSED
UN DB1.DBX 1370.0; // 1st PLC LOOP
UN E 4.5; // TENSIONED
UN E 4.1; // REAR SPN
O E 4.0; // BERO FRONT
= M 91.2; // AFG MELDUNG 7050 NO PART CLAMPED
= M 95.2; // SFG MELDUNG 7050 NO PART CLOSED
= M 97.2; // NC START INTERLOCK MESSAGE 7050 NO PART CLAMPED
= DB3.DBX 6.2; // NO PART CLAMPED (7050)
U E 4.0; // BERO FRONT
U M 18.5; // EXIT FLAG CLAMP VICE
S DB2.DBX 3.6; // NO PART CLAMPED (ALARM 6030)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 3.6; // NO PART CLAMPED (ALARM 6030)
```

```
NETWORK 6
TITLE = SPN SPANNEN
U M 140.0; // CLAMPING
L S5TIME # 700MS; // 0.1 S
SE T 22;
R M 18.6; // RELEASE THE EXIT FLAG VICE
U M 140.0; // CLAMPING
U T 22;
S M 18.5; // EXIT FLAG CLAMP VICE
NETWORK 7
TITLE = SPN RELAX
U M 140.1; // RELAX IN SPN
L S5TIME # 700MS; // 0.1 S
SE T 23; // T23
R M 18.5; // EXIT FLAG CLAMP VICE
U M 140.1; // RELAX IN SPN
U T 23; // T23
S M 18.6; // RELEASE THE EXIT FLAG VICE
NETWORK 8
TITLE = ABORT CONDITION
U M 90.4; // SPN ON THE MOVE
U (;
ON M 15.2; // EMERGENCY STOP SWITCH
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
);
O DB2.DBX 2.4; // VICE FAILED (A6020)
O DB2.DBX 2.6; // SPN BOARD DEFECTIVE (ALARM 6022)
O DB2.DBX 2.3; // VICE TIME OVER (A6019)
O DB2.DBX 3.6; // NO PART CLAMPED (A6030)
R M 18.5; // EXIT FLAG CLAMP VICE
R M 18.6; // RELEASE THE EXIT FLAG VICE
R M 140.0; // CLAMPING
R M 140.1; // RELAX IN SPN
O E 4.1; // REAR SPN
R M 18.6; // RELEASE THE EXIT FLAG VICE
R M 140.1; // RELAX IN SPN
NETWORK 9
TITLE = MONITORING SPN BOARD
U E 4.5; // TENSIONED
UN M 18.5; // EXIT FLAG CLAMP VICE
UN M 18.6; // RELEASE THE EXIT FLAG VICE
L S5TIME
# 2S; // 200 * 0.01 = 2 SECONDS
SE T 30; // SWITCH ON DELAY
U T 30;
S DB2.DBX 2.6; // SPN BOARD DEFECTIVE (ALARM 6022)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 2.6; // SPN BOARD DEFECTIVE (ALARM 6022)
NETWORK 10
TITLE = MONITORING SPM
U M 140.4; // SPM CLOSED
S M 140.7; // HM SPM
UN M 18.5; // EXIT FLAG CLAMP VICE
R M 140.7; // HM SPM
U M 140.7; // HM SPM
UN E 4.5; // SPM CLOSED
S DB2.DBX 2.4; // SPM FAILED (ALARM 6020)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 2.4; // SPM FAILED (ALARM 6020)
NETWORK 11
TITLE = ROBOTIC INTERFACE
```

```
U M 18.5; // EXIT FLAG CLAMP VICE
U E 4.5; // SPM CLOSED
= M 140.4; // SPM CLOSED
= M 138.5; // VICE CLAMPED
= DB20.DBX 310.2; // PLC> SURFACE VICE CLAMPED
U E 4.1; // REAR SPM
= M 138.4; // VICE RELEASED
= DB20.DBX 310.1; // PLC> REAR SURFACE VICE
NETWORK 12
TITLE = NEG.Acknowledgment DNC
U DB20.DBX 302.2; // CLAMPING THE DNC VICE
UN M 140.0; // CLAMPING THE SPM
S DB20.DBX 318.1; // NEG. ACKNOWLEDGMENT DNC
U DB20.DBX 302.1; // RELEASE DNC VICE
UN M 140.1; // RELAX SPM
S DB20.DBX 318.1; // NEG. ACKNOWLEDGMENT DNC
END_FUNCTION
****************************
FUNCTION FC 30: VOID
NAME: PNEUM_VICE
BEGIN
NETWORK
TITLE = VICE CLOSED / OPEN ENABLE
U M 110.3; // AUX-ON MANUAL
U M 114.3; // ACTUAL SPEED LESS THAN 20RPM
UN M 131.7; // AXES IN MOVEMENT
UN M 106.6; // EDIT MODE OPERATING MODE
O DB1.DBX 1370.0; // PLC-1st LOOP
= M 138.0; // ENABLE VICE CLOSED / OPEN
NETWORK
TITLE = HM VICE CLOSED (M26)
U DB20.DBX 324.0; // PROGRAM RUNNING
U DB20.DBX 195.2; // M26 DYN.
O(
U DB15.DBX 20.2 // VICE CLAMPED SAVE IN THE SETTING DATA
U DB1.DBX 1370.0; // PLC-1st LOOP
)
S M 137.5; // HM VICE CLOSED (M26)
NETWORK
TITLE = PERFORMANCE VICE CLOSED
U M 138.0; // ENABLE VICE CLOSED / OPEN
U (;
U M 138.7; // FM BUTTON, VICE CLOSED
UN M 137.1; // FM BUTTON, VICE OPEN
O DB20.DBX 195.2; // M26 DYN.
O(;
O M 149.3; // ROBOTICS / FM VICE CLOSED
O DB20.DBX 302.2; // DNC / VICE CLOSED
);
U (;
ON DB20.DBX 324.0; // PROGRAM RUNNING
O DB20.DBX 324.1; // CORE / STOP
);
O(;
U M 137.5; // HM VICE CLOSED (M26)
UN M 131.7; // AXES IN MOVEMENT
);
);
S M 18.5; // EXIT FLAG CLAMP VICE
R M 18.6; // RELEASE THE EXIT FLAG VICE
= DB20.DBX 259.2; // TRIP M26
S M 137.7; // HM M26 STATIC
R M 137.6; // HM M25 STATIC
NETWORK
```

```
TITLE = BACK. HM VICE CLOSED (M26)
U M 137.5; // HM VICE CLOSED (M26)
UN M 131.7; // AXES IN MOVEMENT
R M 137.5; // HM VICE CLOSED (M26)
NETWORK
TITLE = HM VICE OPEN (M25)
U DB20.DBX 324.0; // PROGRAM RUNNING
U DB20.DBX 195.1; // M25 DYN.
O(
U DB15.DBX 20.1 // VICE RELEASED SAVE IN THE SETTING DATA
U DB1.DBX 1370.0; // PLC-1st LOOP
)
S M 137.4; // HM VICE ON (M26)
NETWORK
TITLE = PERFORMANCE VICE ON
U M 137.1; // FM BUTTON, VICE OPEN
UN M 138.7; // FM BUTTON, VICE CLOSED
O DB20.DBX 195.1; // M25 DYN.
O(;
O M 149.2; // ROBOTICS / FM VICE ON
O DB20.DBX 302.1; // DNC / VICE ON
);
U (;
ON DB20.DBX 324.0; // PROGRAM RUNNING
O DB20.DBX 324.1; // CORE / STOP
);
O(;
U M 137.4; // HM VICE ON (M25)
UN M 131.7; // AXES IN MOVEMENT
);
U M 138.0; // ENABLE VICE CLOSED / OPEN
S M 18.6; // RELEASE THE EXIT FLAG VICE
R M 18.5; // EXIT FLAG CLAMP VICE
= DB20.DBX 259.1; // TRIP M25
S M 137.6; // HM M25 STATIC
R M 137.7; // HM M26 STATIC
NETWORK
TITLE = BACK. HM VICE OPEN (M26)
U M 137.4; // HM VICE ON (M26)
UN M 131.7; // AXES IN MOVEMENT
R M 137.4; // HM VICE ON (M26)
NETWORK
TITLE = VICE CLAMPED
U M 18.5; // EXIT FLAG CLAMP VICE
U E 4.5; // PRESSURE SWITCH VICE
= M 138.5; // VICE CLAMPED
FP M 26.3
NETWORK
TITLE = VICE RELEASED
U M 18.6; // RELEASE THE EXIT FLAG VICE
UN E 4.5; // PRESSURE SWITCH VICE
= M 138.4; // VICE RELEASED
FP M 26.4
NETWORK
SAVE TITLE = VICE IN SETTING DATA
O M 26.3
O M 26.4
SPBN M001;
U M 138.4; // VICE RELEASED
= DB15.DBX 20.1 // VICE RELEASED SAVE IN THE SETTING DATA
U M 138.5; // VICE CLAMPED
= DB15.DBX 20.2 // VICE CLAMPED IN THE SETTINGDA
SAVE TEN
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
```

```
M001: NOP 0;
NETWORK
TITLE = VICE MOV. ACTIVE AFG / EFG
U M 18.5; // EXIT FLAG CLAMP VICE
UN E 4.5; // PRESSURE SWITCH VICE
O;
U M 18.6; // RELEASE THE EXIT FLAG VICE
U E 4.5; // PRESSURE SWITCH VICE
O M 137.5; // HM VICE CLOSED (M26)
O M 137.4; // HM VICE ON (M25)
= M 91.5; // VICE MOV. ACTIVE AFG / EFG
NETWORK
TITLE = 6072 VICE NOT READY
U M 18.5; // EXIT FLAG CLAMP VICE
L S5TIME # 1S; // 10X0.1S
SE T 32; // START T32 AS SWITCH-ON DELAY.
UN E 4.5; // PRESSURE SWITCH VICE
L S5TIME # 200MS; // 2X0.1S
SE T 33; // START T33 AS SWITCH-ON DELAY.
U M 18.6; // RELEASE THE EXIT FLAG VICE
L S5TIME # 1S; // 10X0.1S
SE T 34; // START T34 AS SWITCH-ON DELAY.
U E 4.5; // PRESSURE SWITCH VICE
L S5TIME # 200MS; // 2X0.1S
SE T 35; // START T35 AS SWITCH-ON DELAY.
U T 32; // SCREW TO / SUPERV. SHARP
U T 33; // PRESSURE SWITCH SCREW (0.2S)
O;
U T 34; // SCREW ON / MONITOR SHARP
U T 35; // PRESSURE SWITCH SCREW (0.2S)
O;
UN M 138.5; // VICE CLAMPED
U (;
O DB20.DBX 224.3; // M3 STATIC
O DB20.DBX 224.4; // M4 STATIC
);
S DB2.DBX 9.0; // 6072 VICE NOT READY
U DB2.DBX 9.0; // 6072 VICE NOT READY
U M 114.3; // ACTUAL SPEED LESS THAN 20RPM
R M 18.5; // EXIT FLAG CLAMP VICE
R M 18.6; // RELEASE THE EXIT FLAG VICE
UN M 18.5; // EXIT FLAG CLAMP VICE
UN M 18.6; // RELEASE THE EXIT FLAG VICE
U (
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
)
R DB2.DBX 9.0; // 6072 VICE NOT READY
NETWORK
TITLE = 6050 M25 / M26 WHILE HA
UN M 114.3; // ACTUAL SPEED LESS THAN 20RPM
U DB20.DBX 195.1; // M25 DYN.
S DB2.DBX 6.2; // 6050 M25 WHILE HA
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 6.2; // 6050 M25 WHILE HA
NETWORK
TITLE = 7054 CLOSE VICE
UN M 138.5; // VICE CLAMPED
UN DB3.DBX 5.2; // 7042 MACHINE DOOR INIT.
UN DB3.DBX 2.4; // 7020 SPECIAL OPERATION ACTIVE
UN DB3.DBX 5.0; // 7040 MACHINE DOOR OPEN
UN DB3.DBX 2.0; // 7016 SWITCH ON AUXILIARY DRIVES
UN DB3.DBX 2.1; // 7017 APPROACH REFERENCE POINT
```

```
UN DB3.DBX 2.6; // 7022 INITIALIZE TOOL TURNER
= DB3.DBX 6.6; // 7054 CLOSE THE VICE
NETWORK
TITLE = PLC / OB -> VICE CLAMPED
U M 138.5; // VICE CLAMPED
= DB20.DBX 310.2; // PLC / OB -> VICE CLAMPED
NETWORK
TITLE = PLC / OB -> VICE RELEASED
U M 138.4; // VICE RELEASED
= DB20.DBX 310.1; // PLC / OB -> VICE RELEASED
NETWORK
TITLE = VICE / FC DNC ACKNOWLEDGMENT
U DB1.DBX 1366.0; // DNC OPERATION ACTIVE
U (;
U DB20.DBX 302.2; // DNC / VICE CLOSED
UN M 137.7; // HM M26 STATIC
O;
U DB20.DBX 302.1; // DNC / VICE ON
UN M 137.6; // HM M25 STATIC
);
S DB20.DBX 318.1; // VICE / FC DNC ACKNOWLEDGMENT
END_FUNCTION
FUNCTION FC 21: VOID
NAME: PARTIAL APPLIANCE
BEGIN
NETWORK 1
TITLE = PARTIAL APPLIANCE SWITCH-ON CONDITION
UN E 4.7; // DONE TO SHARE
UN DB1.DBX 1370.0; // PLC-1st LOOP
UN M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
= DB3.DBX 6.3; // PARTIAL APPARATUS NOT LOCKED (M7051)
U E 4.7; // DONE TO SHARE
U DB1.DBX 1370.0; // PLC-1st LOOP
S M 144.4; // READY TO SHARE AND LOCKED
NETWORK 2
TITLE = SHARE PARTIAL APPLIANCE
O DB20.DBX 294.1; // PARTIAL APPLIANCE SHARE KEYBOARD
O DB20.DBX 303.3; // DNC-INTRF.TEILAPPARAT SHARE
UN DB20.DBX 324.0; // PROGRAM RUNNING
O DB20.DBX 195.3; // M27 PARTIAL APPLIANCE SHARE (DYN)
U M 144.7; // PARTIAL APPARATUS RELEASE
UN M 200.0 // SET TOOL POSITIONS
= M 143.0; // SHARE PARTIAL APPLIANCE
= DB20.DBX 259.3; // TRIP M27
NETWORK 3
TITLE = RELEASE PARTIAL APPLIANCE
U M 110.3; // AUX-ON MANUAL
UN M 106.6; // EDIT MODE OPERATING MODE
= M 144.7; // SHARE PARTIAL APPLIANCE RELEASE
NETWORK 4
TITLE = STARTING EDGE FLAG
U M 143.0; // SHARE PARTIAL APPLIANCE
UN M 144.5; // HM START
= M 144.6; // FM START
U M 143.0; // SHARE PARTIAL APPLIANCE
= M 144.5; // HM START
NETWORK 5
TITLE = PARTIAL APPLIANCE STEP 1
U M 144.6; // FM START
UN M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
S M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
S M 144.1; // PARTIAL APPARATUS STEP1
S M 18.7; // SHARE EXIT FLAG SUB-APPARATUS
R M 144.4; // READY TO SHARE AND LOCKED
```

```
L DB10.DBW 4; // UNLOAD TIME
SPS-MSD
ITB; // CONVERTING AN INTEGER INTO A BCD VALUE
T MW 160; // TRANSFER IN MW160
SET;
= M 161.4; // SET TIME GRID 0.1S
U M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
L MW 160;
SE T 7; // SHARE MONITORING TIME
U T 7; // SHARE MONITORING TIME
S DB2.DBX 6.0; // DIVISION TIME EXPIRED (A 6048)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 6.0;
NETWORK 6
TITLE = PARTIAL APPARATUS STEP 2
U M 144.1; // PARTIAL EQUIPMENT STEP 1
UN E 4.7; // PARTIAL APPLIANCE DONE
S M 144.2; // PARTIAL EQUIPMENT STEP 2
R M 144.1; // PARTIAL EQUIPMENT STEP 1
L DB10.DBW 6; // DIVISION TIME FROM SPS-MSD
ITB; // CONVERTING AN INTEGER INTO A BCD VALUE
T MW 162;
SET;
= M 163.4; // SET TIME GRID 0.1S
U M 144.2; // PARTIAL EQUIPMENT STEP 2
L MW 162;
SE T 8; // TIME FOR DIVISION
NETWORK 7
TITLE = PARTIAL APPLIANCE STEP 3
U T 8;
U M 144.2; // PARTIAL EQUIPMENT STEP 2
R M 18.7; // SHARE EXIT FLAG SUB-APPARATUS
S M 144.3; // PARTIAL EQUIPMENT STEP 3
R M 144.2; // PARTIAL EQUIPMENT STEP 2
L DB10.DBW 8; // LOCKING TIME FROM SPS-MSD
ITB; // CONVERTING AN INTEGER INTO A BCD VALUE
T MW 164;
SET;
= M 165.4; // SET TIME GRID 0.1S
U M 144.3; // PARTIAL EQUIPMENT STEP 3
L MW 164;
SE T 9;
U T 9;
S DB2.DBX 6.1; // LOCKING TIME ENDED (A 6049)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 6.1; // LOCKING TIME ENDED (A 6049)
NETWORK 8
TITLE = PARTIAL APPLIANCE DONE DONE
U M 144.3; // PARTIAL EQUIPMENT STEP 3
U E 4.7; // DONE TO SHARE
S M 144.4; // READY TO SHARE AND LOCKED
R M 144.3; // PARTIAL EQUIPMENT STEP 3
R M 144.0; // PARTIAL APPLIANCE PARTS ACTIVE
NETWORK 9
TITLE = PARTIAL APPARATUS ON THE MOVE
O M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
ON E 4.7; // DONE TO SHARE
= M 92.0; // PART APPARATUS IN MOVEMENT (EFG)
= M 97.4; // PART IN MOTION (NC START LOCK)
NETWORK 10
TITLE = ABORT CONDITION
O DB2.DBX 6.0; // DIVISION TIME EXPIRED (A 6048)
```

```
O DB2.DBX 6.1; // LOCKING TIME ENDED (A 6049)
O DB2.DBX 6.2; // PARTIAL UNIT FAILED (A 6050)
R M 18.7; // SHARE EXIT FLAG SUB-APPARATUS
R M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
R M 144.1; // PARTIAL EQUIPMENT STEP 1
R M 144.2; // PARTIAL EQUIPMENT STEP 2
R M 144.3; // PARTIAL EQUIPMENT STEP 3
R M 144.4; // READY TO SHARE AND LOCKED
NETWORK 11
TITLE = MONITORING PART UNIT
U M 144.4; // READY TO SHARE AND LOCKED
UN E 4.7; // DONE TO SHARE
S DB2.DBX 6.2; // PARTIAL APPLIANCE FAILED (A 6050)
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
R DB2.DBX 6.2; // PARTIAL APPLIANCE FAILED (A 6050)
NETWORK 12
TITLE = NEG.Acknowledgment DNC
U DB20.DBX 303.3; // DNC-INTRF.TEILAPPARAT SHARE
UN M 144.0; // PARTIAL APPLIANCE SHARE ACTIVE
S DB20.DBX 318.5; // NEG. ACKNOWLEDGMENT DNC
U M 144.4; // READY TO SHARE AND LOCKED
= DB20.DBX 311.0; // SPLIT PLC SURFACE FINISHED AND LOCKED
END_FUNCTION
FUNCTION FC 22: VOID
NAME: BLOW OUT
BEGIN
NETWORK 1
TITLE = BLOW OUT FM KEY
O DB20.DBX 294.6; // BLOW OUT PC KEY
UN M 200.0 // SET TOOL POSITIONS
FP M 142.7; // BLOW OUT FM BUTTON
NETWORK 2
TITLE = BLOW OUT ON
U M 142.7; // BLOW OUT FM
UN M 142.2; // BLOW OUT
= M 142.1; // HM
S M 142.2; // BLOW OUT
NETWORK 3
TITLE = BLOW OUT
U M 142.7; // BLOW OUT FM
U M 142.2; // BLOW OUT
UN M 142.1; // HM
R M 142.2; // BLOW OUT
NETWORK 4
TITLE = EXHAUST VALVE ON
U (;
U M 142.7; // BLOW OUT FM
U M 142.2; // BLOW OUT
O DB20.DBX 200.7; // M71 BLOW OUT ON
O DB20.DBX 303.0; // BLOW-OUT DNC
);
U M 110.3; // AUX ON MANUAL
S M 18.2; // EXIT FLAG BLOW-OUT VALVE
S M 142.2; // BLOW OUT
= DB20.DBX 264.7; // TRIP M71
S DB20.DBX 310.7; // PLC> BLOW OUT SURFACE ACTIVE
NETWORK 5
TITLE = EXHAUST VALVE OFF
U M 142.7; // BLOW OUT FM
UN M 142.2; // BLOW OUT
O DB20.DBX 201.0; // BLOW OUT M72
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB1.DBX 1440.0; // RESET TRIPPED
```

```
O DB20.DBX 302.7; // BLOW OUT DNC
ON M 110.3; // AUX ON MANUAL
R M 18.2; // EXIT FLAG BLOW-OUT VALVE
R M 142.2; // BLOW OUT
R DB20.DBX 310.7; // PLC> BLOW OUT SURFACE ACTIVE
= DB20.DBX 265.0; // TRIP M72
NETWORK 6
TITLE = DNC COMMANDS AND FEEDBACK
U DB20.DBX 303.0; // BLOW-OUT DNC
UN DB20.DBX 264.7; // TRIP M71
S DB20.DBX 318.4; // NEG. ACKNOWLEDGMENT DNC
U DB20.DBX 302.7; // BLOW OUT DNC
AND
B20.DBX 265.0; // TRIP M72
S DB20.DBX 318.4; // NEG. ACKNOWLEDGMENT DNC
END_FUNCTION
FUNCTION FC 26: VOID
NAME: COOLANT
BEGIN
NETWORK
TITLE = FM KEY COOLANT (MSTT / PC)
UN DB10.DBX 75.3; // BLOW DEVICE ACTIVATED
UN M 15.1; // MACHINE DOOR OPEN
UN M 200.0 // SET TOOL POSITIONS
U (
O DB20.DBX 294.6; // COOLANT BUTTON (PC)
O DB20.DBX 831.1 // COOLANT KEY (MSTT)
)
FP M 107.7; // FM BUTTON COOLANT
NETWORK
TITLE = COOLANT SELECTION ON
UN M 107.1; // COOLANT ON
U M 107.7; // FM BUTTON COOLANT
O;
U DB20.DBX 225.1; // M9 STATIC
U DB20.DBX 193.0; // M8 DYN.
UN DB20.DBX 192.7; // M7 DYN.
O DB20.DBX 302.6; // DNC / COOLANT ON
S M 107.1; // COOLANT ON
S M 117.1; // M7 MINIMAL LUBRICATION ON
= M 107.2; // HM COOLANT ON
= DB20.DBX 257.0; // TRIP M8
NETWORK
TITLE = SELECT MINIMAL LUBRICATION ON
U DB20.DBX 225.1; // M9 STATIC
U DB20.DBX 192.7; // M7 DYN.
UN DB20.DBX 193.0; // M8 DYN.
S M 117.1; // M7 MINIMAL LUBRICATION ON
= DB20.DBX 256.7; // TRIP M7
NETWORK
TITLE = COOLANT PROGRAMMED
U DB20.DBX 326.4; // KERN / BA AUTO
U DB20.DBX 257.0; // TRIP M8
U DB20.DBX 193.0; // M8 DYN.
S M 107.3; // COOLANT PROGRAMMED
NETWORK
TITLE = COOLANT SELECTION ON
U M 107.1; // COOLANT ON
UN M 107.2; // HM COOLANT ON
U M 107.7; // FM BUTTON COOLANT
UN M 107.3; // COOLANT PROGRAMMED
O;
U DB20.DBX 193.1; // M9 DYN.
O DB20.DBX 302.5; // DNC / COOLANT OFF
```

```
O;
U M 107.4; // COOLANT INTERRUPTION
UN DB20.DBX 326.4; // KERN / BA AUTO
O DB1.DBX 1370.0; // 1st PLC LOOP
O DB1.DBX 1440.0; // RESET TRIPPED
O DB1.DBX 1370.3; // RESET KEY PRESSED
ON M 110.3; // AUX-ON MANUAL
R M 107.1; // COOLANT ON
R M 117.1; // M7 MINIMAL LUBRICATION ON
R M 107.3; // COOLANT PROGRAMMED
= DB20.DBX 257.1; // TRIP M9
NETWORK
TITLE = INTERRUPT COOLANT WITH KEY
U M 107.3; // COOLANT PROGRAMMED
UN M 107.4; // COOLANT INTERRUPTION
U M 107.7; // FM BUTTON COOLANT
S M 107.4; // COOLANT INTERRUPTION
= M 107.5; // HM COOLANT INTERRUPTION
U M 107.4; // COOLANT INTERRUPTION
UN M 107.5; // HM COOLANT INTERRUPTION
U M 107.7; // FM BUTTON COOLANT
ON M 107.1; // COOLANT ON
R M 107.4; // COOLANT INTERRUPTION
NETWORK
TITLE = COOLANT RELEASE
U (;
ON M 15.1; // MACHINE DOOR OPEN
O DB20.DBX 294.6; // COOLANT BUTTON (PC)
);
UN M 107.4; // COOLANT INTERRUPTED
UN M 0.0; // M0 / M1 ACTIVE
UN DB20.DBX 324.2; // DRYRUN
UN M 200.0 // SET TOOL POSITIONS
UN M 52.0; // TOOL TURNING ACTIVE
= M 107.0; // COOLANT RELEASE
NETWORK
TITLE = COOLANT PERFORMANCE
U M 107.1; // COOLANT ON
U M 107.0; // COOLANT RELEASE
= M 17.2; // EXIT FLAG COOLANT (M8 = ON / M9 = OFF)
NETWORK
TITLE = MINIMAL LUBRICATION PERFORMANCE
U M 117.1; // M7 MINIMAL LUBRICATION ON
U M 107.0; // COOLANT RELEASE
= M 18.0; // INITIAL FLAG MINIMAL LUBRICATION
NETWORK
TITLE = PLC / OB -> COOLANT ON
U M 107.1; // COOLANT ON
= DB20.DBX 310.5; // PLC / OB -> COOLANT ON
NETWORK
TITLE = PLC / OB -> COOLANT INJECT
U M 17.2; // EXIT FLAG COOLANT (M8 = ON / M9 = OFF)
= DB20.DBX 310.6; // PLC / OB -> COOLANT INJECT
NETWORK
TITLE = COOLANT / FC DNC ACKNOWLEDGMENT
U DB1.DBX 1366.0; // DNC OPERATION ACTIVE
U (;
U DB20.DBX 302.6; // DNC / COOLANT ON
UN DB20.DBX 225.0; // M8 STATIC
O;
U DB20.DBX 302.5; // DNC / COOLANT OFF
UN DB20.DBX 225.1; // M9 STATIC
);
S DB20.DBX 318.3; // COOLANT / FC DNC ACKNOWLEDGMENT
```

```
END_FUNCTION
FUNCTION FC 40: VOID
NAME: ROBOTICS_INTERFACE
BEGIN
NETWORK
TITLE = robotics axes are at the reference point
L DB1.DBD 70; // REF-POSITION X
L -0.5E-03; // 0.5MM
+ R;
L DB1.DBD 0; // IS POSITION X
<R;
= M 168.0
L DB1.DBD 74; // REF-POSITION Y
L -0.5E-03; // 0.5MM
+ R;
L DB1.DBD 4; // IS POSITION Y
<R;
= M 168.1
L DB1.DBD 78; // REF-POSITION Z
L -0.5E-03; // 0.5MM
+ R;
L DB1.DBD 8; // IS POSITION Z
<R;
= M 168.2
U M 168.0
U M 168.1
U M 168.2
U DB1.DBX 134.0; // REFERENCE POINT X-AXIS ACTIVE
U DB1.DBX 134.1; // REFERENCE POINT Y-AXIS ACTIVE
U DB1.DBX 134.2; // REFERENCE POINT Z-AXIS ACTIVE
= M 19.1; // ROBOTICS AXES ARE AT REF. POINT.
NETWORK 1
TITLE = DOOR OPEN / CLOSE
; U E 5.0; // ORDER THE DOOR TO CLOSE
; FP M 152.0; // FM DOOR CLOSED
; U E 5.1; // ORDER DOOR OPEN
; FP M 152.1; // FM DOOR OPEN
; U M 152.0; // FM DOOR CLOSED
U E 5.0; // ORDER THE DOOR TO CLOSE
UN E 5.1; // OPEN THE DOOR
= M 149.0; // HAND-OVER MARKER DOOR CLOSED
; U M 152.1;
// FM DOOR OPEN
U E 5.1; // ORDER DOOR OPEN
UN E 5.0; // CLOSE THE DOOR
= M 149.1; // HANDOVER MARK DOOR OPEN
NETWORK 2
TITLE = SPM FORWARD / BACK
U E 5.2; // COMMAND SPM BACK
FP M 152.2; // FM SPM BACK
U E 5.3; // COMMAND SPM FORWARD
FP M 152.3; // FM SPM BEFORE
U M 152.2; // FM SPM BACK
UN E 5.3; // SPM BEFORE
= M 149.2; // ROBOTICS / FM VICE ON
U M 152.3; // FM SPM BEFORE
UN E 5.2; // SPM BACK
= M 149.3; // ROBOTICS / FM VICE CLOSED
NETWORK 3
TITLE = CYCLE START
U E 5.6; // COMMAND CYCLE START
FP M 150.1; // FM CYCLE START
NETWORK 4
TITLE = FEEDHOLD ROBOTICS INTERFACE
```

```
U E 5.7; // COMMAND FEEDHOLD
= DB3.DBX 0.7; // AFG, EFG FEEDHOLD (MESSAGE 7007)
NETWORK 5
TITLE = OUTPUTS ROBOTICS INTERFACE
U M 148.1;
= M 19.3; // EXIT FLAG ROBOTICS DOOR OPEN
U M 148.0;
= M 19.4; // EXIT FLAG ROBOTICS DOOR CLOSED
U M 138.4; // VICE RELEASED
= M 19.5; // INITIAL FLAG ROBOTICS REAR VICE
U M 138.5; // VICE CLAMPED
= M 19.6; // EXIT FLAG ROBOTICS VICE CLAMPED
NETWORK 6
TITLE = PROGRAM STANDING
O M 0.0; // M0 / M1 ACTIVE
O DB20.DBX 224.2; // M2 STATIC
O DB20.DBX 227.6; // M30 STATIC
= M 19.0; // EXIT FLAG ROBOTICS PROGRAM STOP (M30, M0, M1, M2)
END_FUNCTION
FUNCTION FC 63: VOID
NAME: WARNING LIGHT
BEGIN
NETWORK
TITLE = FLASHING LIGHT PULSE DURATION
U DB1.DBX 1370.0; // 1st PLC LOOP
SPBN M001
L DB10.DBW 10; // LOADING TIME FROM SPS-MSD
ITB; // CONVERTING AN INTEGER INTO A BCD VALUE
T MW 70; // TRANSFER IN MW30
SET;
R M 71.4; // SET TIME GRID 0.01S
R M 71.5; // SET TIME GRID 0.01S
M001: NOP 0
UN T 48; // PAUSE DURATION
L MW 70; // LOAD MW30
SV T 47; // START AS AN EXTENDED PULSE
NETWORK
TITLE = FLASHING LIGHT PAUSE DURATION
U DB1.DBX 1370.0; // 1st PLC LOOP
SPBN M002
L DB10.DBW 12; // LOADING TIME FROM SPS-MSD
ITB; // CONVERTING AN INTEGER INTO A BCD VALUE
T MW 72; // TRANSFER IN MW32 (TIME GRID IS 0.01S)
SET;
R M 73.4; // SET TIME GRID 0.01S
R M 73.5; // SET TIME GRID 0.01S
M002: NOP 0
UN T 47; // PULSE DURATION
L MW 72; // LOAD MW30
SV T 48; // START AS AN EXTENDED PULSE
END_FUNCTION
FUNCTION FC 62: VOID
NAME: LED CONTROL
BEGIN
NETWORK
TITLE = LAMP TEST
; U DB20.DBX 294.7 // 8 *************
; S DB20.DBX 846.0 // SKIP
; S DB20.DBX 846.1 // DRYRUN
; S DB20.DBX 847.0 // CLOSE THE DOOR
; S DB20.DBX 847.1 // OPEN THE DOOR
; S DB20.DBX 847.3 // 1X KEY
; S DB20.DBX 847.4 // OPT.STOP (M1)
; S DB20.DBX 848.4 // CHUCK
```

```
;·S·DB20.DBX·848.6·//·RESET
;·S·DB20.DBX·848.7·//·SINGLE·BLOCK
;·S·DB20.DBX·849.6·//·QUILL·BACK
;·S·DB20.DBX·849.7·//·QUILL·FORE
;·S·DB20.DBX·850.0·//·TOOL·TURNING
;·S·DB20.DBX·850.4·//·APPROACH·REFERENCE·POINT
;·S·DB20.DBX·851.1·//·COOLANT
;·S·DB20.DBX·851.4·//·PROGRAM·STOP
;·S·DB20.DBX·851.5·//·PROGRAM·START
;·S·DB20.DBX·851.6·//·FEED·RATE·STOP
;·S·DB20.DBX·852.0·//·FEED·RATE·START
;·S·DB20.DBX·852.1·//·SPINDLE·STOP
;·S·DB20.DBX·852.3·//·SPINDLE·START
;·S·DB20.DBX·852.4·//·AUX·OFF
;·S·DB20.DBX·852.6·//·AUX·ON
;·ROBOTICS·TEST
;
;·R·DB20.DBX·846.0·//·SKIP
;·R·DB20.DBX·846.1·//·DRYRUN
;·R·DB20.DBX·847.0·//·CLOSE·THE·DOOR
;·R·DB20.DBX·847.1·//·OPEN·THE·DOOR
;·R·DB20.DBX·847.3·//·1X·KEY
;·R·DB20.DBX·847.4·//·OPT.STOP·(M1)
;·R·DB20.DBX·848.4·//·CHUCK
;·R·DB20.DBX·848.6·//·RESET
;·R·DB20.DBX·848.7·//·SINGLE·BLOCK
;·R·DB20.DBX·849.6·//·QUILL·BACK
;·R·DB20.DBX·849.7·//·QUILL·FORE
;·R·DB20.DBX·850.0·//·TOOL·TURNING
;·R·DB20.DBX·850.4·//·APPROACH·REFERENCE·POINT
;·R·DB20.DBX·851.1·//·COOLANT
;·R·DB20.DBX·851.4·//·PROGRAM·STOP
;·R·DB20.DBX·851.5·//·PROGRAM·START
;·R·DB20.DBX·851.6·//·FEED·RATE·STOP
;·R·DB20.DBX·852.0·//·FEED·RATE·START
;·R·DB20.DBX·852.1·//·SPINDLE·STOP
;·R·DB20.DBX·852.3·//·SPINDLE·START
;·R·DB20.DBX·852.4·//·AUX·OFF
;·R·DB20.DBX·852.6·//·AUX·ON
;·U·T·47;·//·BLINK·PULSE
;·=·DB20.DBX·851.0
;
;
;·U·T·48;·//·START·AS·AN·EXTENDED·PULSE
;·=·DB20.DBX·850.6
NETWORK
TITLE·=
;
;
NETWORK
TITLE·=·COOLANT
U·M·18.0;·//·INITIAL·FLAG·MINIMAL·LUBRICATION
=·DB20.DBX·851.1·//·LED·COOLANT
NETWORK
TITLE·=·DRYRUN·ACTIVE
U·DB20.DBX·324.2·//·DRYRUN·active
;·U·M·94.x;·//·DRYRUN·SFG
=·DB20.DBX·846.1·//·LED·DRYRUN
NETWORK
TITLE·=·FADE-OUT·SET·SKIP
U·DB20.DBX·324.6·//·Skip·block·(SKIP)·active
=·DB20.DBX·846.0·//·LED·SKIP
NETWORK
TITLE·=·optional·stop·M1·active
```

```
U DB20.DBX 324.5 // Optional stop M1 active
= DB20.DBX 847.4 // LED OPT.STOP (M1)
NETWORK
TITLE = SINGLE SENTENCE
U DB20.DBX 324.7 // Single block (SINGLE) active
= DB20.DBX 848.7 // LED SINGLE BLOCK
NETWORK
TITLE = AUX ON LIGHT, AUX OFF FLASHING
; U T 47; // START AS AN EXTENDED PULSE
O M 110.0; // AUX-ON
= DB20.DBX 852.6 // LED AUX ON
NETWORK
TITLE = APPROACH REFERENCE POINT
U T 47; // START AS AN EXTENDED PULSE
U M 110.0; // AUX-ON
O M 121.3; // REFPKT.X, Z, APPROACH AT THE SAME TIME
UN M 52.2 // REFERENCE POINT X, Y, Z AND TOOL C-AXIS ACTIVE
; UN DB20.DBX 324.4; // REFERENCE POINT ACTIVE
; UN DB3.DBX 2.6; // 7022 INITIALIZE TOOL TURNER
= DB20.DBX 850.4 // LED APPROACH REFERENCE POINT
; NETWORK
; TITLE = TOOL TURNING ACTIVE
;
; U DB3.DBX 2.6; // 7022 INITIALIZE TOOL TURNER
; U T 47; // START AS AN EXTENDED PULSE
; O M 152.0; // TOOL TURNING ACTIVE
; = DB20.DBX 850.0 // LED TOOL TURNING
NETWORK
TITLE = SPINDLE STOP ACTIVE
U M 132.1; // SPINDLE STOP ACTIVE
U T 47; // START AS AN EXTENDED PULSE
= DB20.DBX 852.3 // LED SPINDLE START
NETWORK
TITLE = FEED STOP ACTIVE
; U M 133.1; // FEED STOP ACTIVE
U M 91.6; // AFG, EFG FEED STOP ACTIVE
U T 47; // START AS AN EXTENDED PULSE
= DB20.DBX 852.0 // LED FEED START
NETWORK
TITLE = LED PROGRAM STOP ACTIVE
U DB20.DBX 324.0; // program is running
U DB20.DBX 324.1; // STOP STATE
U T 47; // START AS AN EXTENDED PULSE
= DB20.DBX 851.5 // PROGRAM START
NETWORK
TITLE = VICE CLAMPED
O M 138.5; // VICE CLAMPED
O T 47; // START AS AN EXTENDED PULSE
U DB10.DBX 75.4; // ACTIVATE PNEUMATIC CLAMPING DEVICE
= DB20.DBX 849.6 // LED VICE CLAMPED
NETWORK
TITLE = DOOR CLOSED AUTOMATIC DOOR
O T 47; // START AS AN EXTENDED PULSE
O A 3.4; // EXIT FOR AUXILIARY RELAY DOOR CLOSED
U DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
= DB20.DBX 847.0 // CLOSE THE DOOR
NETWORK
TITLE = END PROGRAM AND CLEAR LED
; U DB1.DBX 1440.1; // EXIT PROGRAM
; U M 110.0; // AUX-ON
; R DB1.DBX 1440.1; // EXIT PROGRAM
U DB1.DBX 1440.1; // EXIT PROGRAM
UN M 110.0; // AUX-ON
SPBN M001
```

```
L W # 16 # 0; // LOAD CONSTANT HEX 0
T DB20.DBW 846 // CLEAR LED IN CONTROL PANEL
T DB20.DBW 848 // CLEAR LED IN CONTROL PANEL
T DB20.DBW 850 // CLEAR LED IN CONTROL PANEL
T DB20.DBW 852 // CLEAR LED IN CONTROL PANEL
M001: NOP 0
END_FUNCTION
FUNCTION FC 75: VOID
SURNAME:
BEGIN
U A 3.4; // MACHINE DOOR CLOSED
L S5TIME # 5S; // 2S
SE T 14; // SWITCH-ON DELAY
U T 14; // SWITCH-ON DELAY
S M 400.0 // OPEN FLAG DOOR
R M 400.1 // FLAG CLOSE THE DOOR
FP M 400.2
U M 400.2
SPBN M001;
L MD 410
L 1.
+ R
T MD 410
M001: NOP 0;
U E 4.4; // DOOR OPEN, AUTOMATIC DOOR
S M 400.1 // MARKER CLOSE THE DOOR
R M 400.0 // OPEN FLAG DOOR
END_FUNCTION
ORGANIZATION_BLOCK OB 1
NAME: ORGANIZATIONAL BLOCK
BEGIN
U DB10.DBX 2.0; // ACTIVATE AC 2000
U E 3.0 // INPUT IDENTIFICATION AC95 CONVERSION TO ACC
= M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
O DB10.DBX 100.1 // STANDARD MACHINE ACTIVATED
O DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXIS ACTIVATED
O M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
ON DB10.DBX 2.0; // ACTIVATE AC 2000
U (
O DB1.DBX 1403.7 // CAM Concept surface
O DB1.DBX 1406.0 // EASY CYCLE surface
)
CC FC 64 // M0 RELEASE WITH TXX AND CAMCONCEPT
O DB10.DBX 100.1 // STANDARD MACHINE ACTIVATED
O DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXIS ACTIVATED
O M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
U DB1.DBX 1406.1 // WinNc for Sinumeric Operate
CC FC 65 // TRIP M0 and move up the Z-axis with TXX and Sinumeric Operate
CALL FC 34; // ASSIGN THE INPUTS AC 95 - ACC
U DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
CC FC 23 // SAFETY CIRCUIT ACC
CALL FC 1; // INITIALIZATIONS
O DB10.DBX 100.1 // STANDARD MACHINE ACTIVATED
O DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXIS ACTIVATED
UN DB10.DBX 100.0 // SET TOOL TURNERS ENABLED
UN DB10.DBX 100.3 // TOOL TURNER ACTIVATED
UN DB10.DBX 100.4 // TOOL TURNER AND ROUND AXLE ACTIVATED
ON DB10.DBX 2.0; // ACTIVATE AC 2000
O M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
CC FC 0; // SIMULATE TOOL TURNERS
U DB1.DBX 1426.1; // ROBOTICS INTERFACE ACTIVATED WITH DISKETTE
U DB10.DBX 75.7; // ROBOTICS INTERFACE ACTIVATED WITH WINCONFIG
CC FC 40; // ROBOTICS INTERFACE
```

```
CALL FC 10; // AT PROGRAM END, RESET OR RESTART
CALL FC 11; // NC START AND NC STOP FROM M0 OR M1
CALL FC 5; // AXES READINESS
O M 115.0; // FELDERER FU
CC FC 3; // MAIN DRIVE FELDERER FU
O M 115.1; // LENZE FU
CC FC 33; // MAIN DRIVE LENZE FU
CALL FC 4; // OPERATING MODES
UN DB10.DBX 2.0; // ACTIVATE AC 2000
CC FC 8; // AUX_ON AC95
U DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
CC FC 9; // AUX_ON ACC
U M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
CC FC 88 // AUX_ON AC95 CONVERSION TO ACC
CALL FC 6; // AXES_JOG
CALL FC 32; // AUTOMATICALLY SWITCH TO BA REF
CALL FC 7; // REFERENCE AXES
CALL FC 16; // PLC-> OBEFL.SIGNALE
CALL FC 14; // ALARM STATUS
U DB10.DBX 75.0; // ACTIVATE THE AUTOMATIC DOOR
CC FC 17; // AUTOMATIC DOOR
U DB10.DBX 75.1; // tbsp. ACTIVATE VICE
UN DB10.DBX 75.4; // ACTIVATE PNEUMATIC CLAMPING DEVICE
U (
ON DB10.DBX 2.0; // ACTIVATE AC 2000
O M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
)
CC FC 18; // tbsp. VICE
U DB10.DBX 75.4; // ACTIVATE PNEUMATIC CLAMPING DEVICE
UN DB10.DBX 75.1; // ACTIVATE EL.VICE
CC FC 30; // PNEUM.CLAMPING DEVICE
UN DB10.DBX 75.4; // ACTIVATE PNEUMATIC CLAMPING DEVICE
UN DB10.DBX 75.1; // ACTIVATE EL.VICE
S M 18.6; // RELEASE THE EXIT FLAG VICE
R M 18.5; // EXIT FLAG CLAMP VICE
FP M 26.5
U M 26.5
SPBN M001;
R DB15.DBX 20.2 // VICE CLAMPED SAVE IN THE SETTING DATA
= DB15.DBX 20.1 // VICE RELEASED SAVE IN THE SETTING DATA
= DB20.DBX 348.3; // REQUEST FOR IMMEDIATE SETTING DATA BACKUP
M001: NOP 0;
U DB10.DBX 75.6; // ACTIVATE SCHÄFER PARTIAL APPLIANCE
CC FC 21; // PARTIAL APPARATUS
U DB10.DBX 75.3; // ACTIVATE THE BLOW DEVICE
CC FC 22; // BLOW OUT
CALL FC 26; // COOLANT (M8 / M9)
CALL FC 2; // ITEM COUNTER
O DB10.DBX 100.4 // TOOL TURNER AND ROUND AXIS ACTIVATED
O DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXIS ACTIVATED
U DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
= M 52.7 // ROUND AXIS ACTIVATED
O DB10.DBX 100.0 // SET TOOL TURNERS ENABLED
O DB10.DBX 100.3 // TOOL TURNER ACTIVATED
O DB10.DBX 100.4 // TOOL TURNER AND ROUND AXIS ACTIVATED
UN DB10.DBX 100.1 // STANDARD MACHINE ACTIVATED
UN DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXLE ACTIVATED
U DB10.DBX 2.0; // ACTIVATE AC 2000
UN M 2.0 // IDENTIFICATION AC95 CONVERSION TO ACC
= M 52.5 // TOOL TURNER ACTIVATED
U M 52.5 // TOOL TURNER ACTIVATED
CC FC 51; // TOOL CLAMPING SYSTEM
```

```
U M 52.5 // TOOL TURNER ACTIVATED
CC FC 50; // TOOL TURNERS
U M 200.0 // SET TOOL POSITIONS
U DB10.DBX 100.0 // SET TOOL TURNERS ACTIVATED
CC FC 49 // ENTER TOOL POSITIONS IN MILL55_ACC.MSD
CALL FC 12; // AFG / EFG
CALL FC 13; // NC START VERR. AND CONTROL BUTTONS
U M 300.0 //
CC FC 75; //
O DB1.DBX 1370.2; // ACKNOWLEDGMENT KEY PRESSED
O DB1.DBX 1370.3; // RESET KEY PRESSED
O DB2.DBX 1.1; // HW ERROR SAFETY CIRCUIT
R M 300.0 //
R M 400.0 // OPEN FLAG DOOR
R M 400.1 // FLAG CLOSE THE DOOR
CALL FC 62; // LED CONTROL
CALL FC 63; // WARNING LIGHT
CALL FC 41; // RENISHAW PROBE
U DB10.DBX 2.0; // ACTIVATE ACC
CC FC 66; // HANDWHEEL
CALL FC 35; // ASSIGN THE OUTPUTS AC95 - ACC
; DB10.DBX B100 =; Bit 0 1 (MILL55_.MSD) SET TOOL TURNING ACTIVATED
; DB10.DBX B100 =; Bit 1 2 (MILL55A.MSD) STANDARD MACHINE ACTIVATED
; DB10.DBX B100 =; Bit 2 4 (MILL55B.MSD) STANDARD MACHINE WITH ROUND AXIS ACTIVATED
; DB10.DBX B100 =; Bit 3 8 (MILL55C.MSD) TOOL TURNER ACTIVATED
; DB10.DBX B100 =; Bit 4 16 (MILL55D.MSD) TOOL TURNER AND ROUND AXIS ACTIVATED
; U DB10.DBX 100.0 // SET TOOL TURNERS ACTIVATED
; U DB10.DBX 100.1 // STANDARD MACHINE ACTIVATED
; U DB10.DBX 100.2 // STANDARD MACHINE WITH ROUND AXIS ACTIVATED
; U DB10.DBX 100.3 // TOOL TURNER ACTIVATED
; U DB10.DBX 100.4 // TOOL TURNERS AND ROUND AXES ACTIVATED
U DB25.DBX 332.0; // NC BLOCK DONE
R DB25.DBX 332.0; // NC BLOCK DONE
END_ORGANIZATION_BLOCK
```