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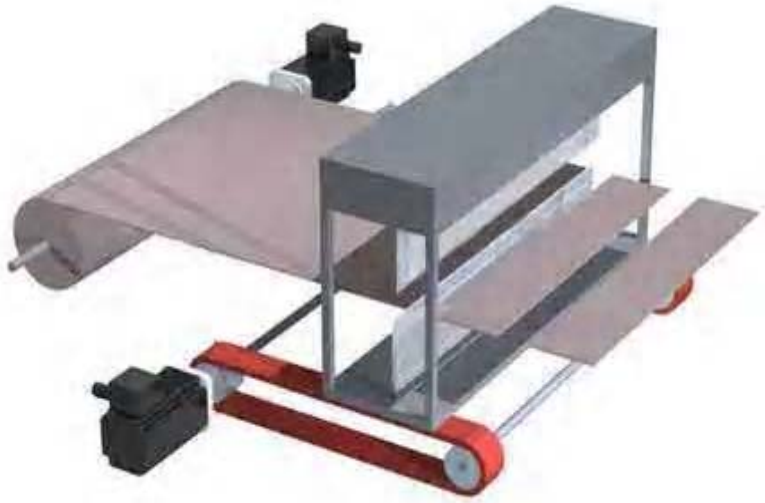
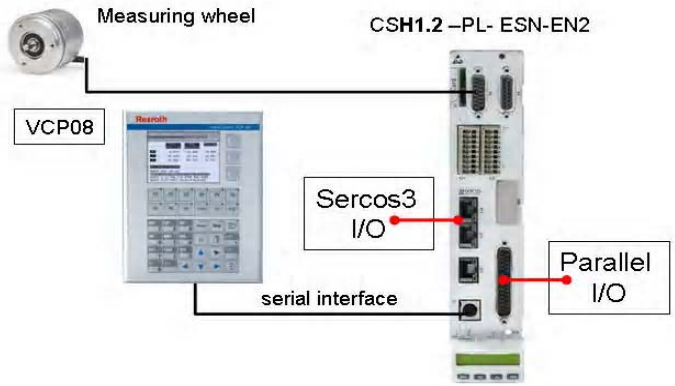
Flying Shear – Operation, Commissioning and Service

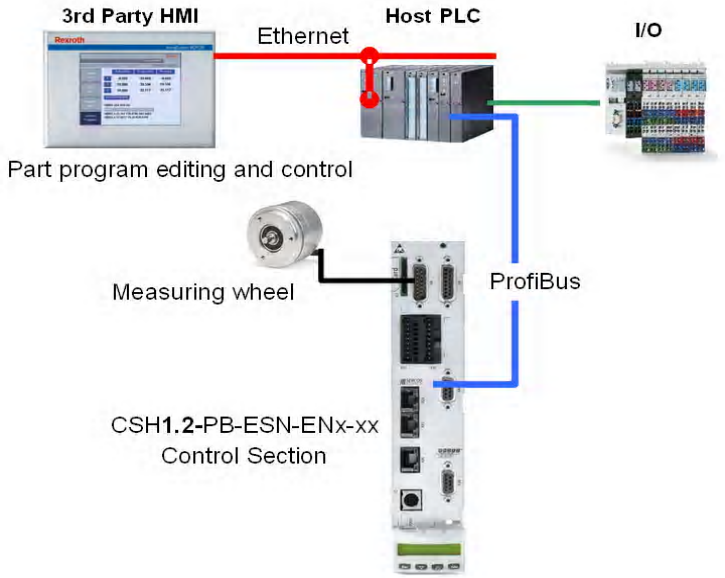


2007-08-01

Presentation Overview

- Basic concepts and overview
- Hardware / System Requirements
- System Setup
  - Drive/System commissioning
  - Part/Tool Data / Tool Programs
- Basic Operation
  - Command/Status Signals
  - Runtime Status Data
  - Tool Program Operation
  - Test Mode
- Advanced Operation
  - Short Part
  - Optimized Return
  - Registration
  - Bad Material Tracking



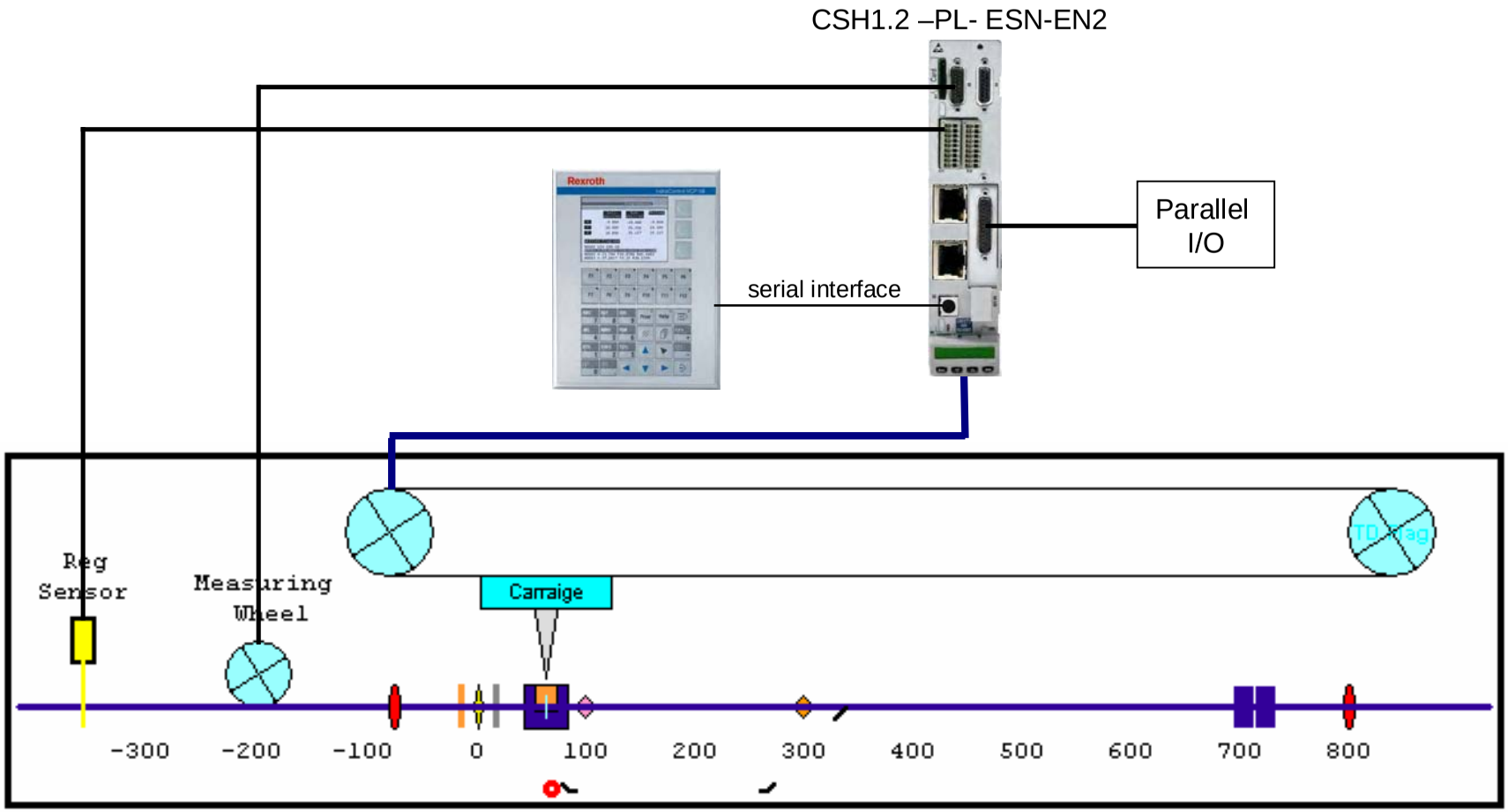


Basic concepts and overview

System Concept for Flying Shear (1)

- Flying Shear is provided as a Turn-key system solution
- Complete system provided on MMC card
  - PLC program – read to run project (no PC required)
  - PLC Archive code – User Tool programs and FS library
  - VCP precompiled screens – ready to load via USB stick
- Core technology is contained in Library (no user modifications allowed)
- Offered with Digital I/O or ProfiBus interface (Ethernet IP / Device_Net??)
- Optional VCP HMI for commissioning and operation
- For basic systems no PLC programming is required (No IndraLogic)
- For advanced systems custom User Tool Programs allow additional functionality (IndraLogic required to program tool templates)
- Commissioning of Drive requires IndraWorks (from VCP possible)
- Commissioning of Flying Shear with either VCP, ProfiBus or IndraLogic

System Concept for Flying Shear (2)



System Concept for Flying Shear (3)

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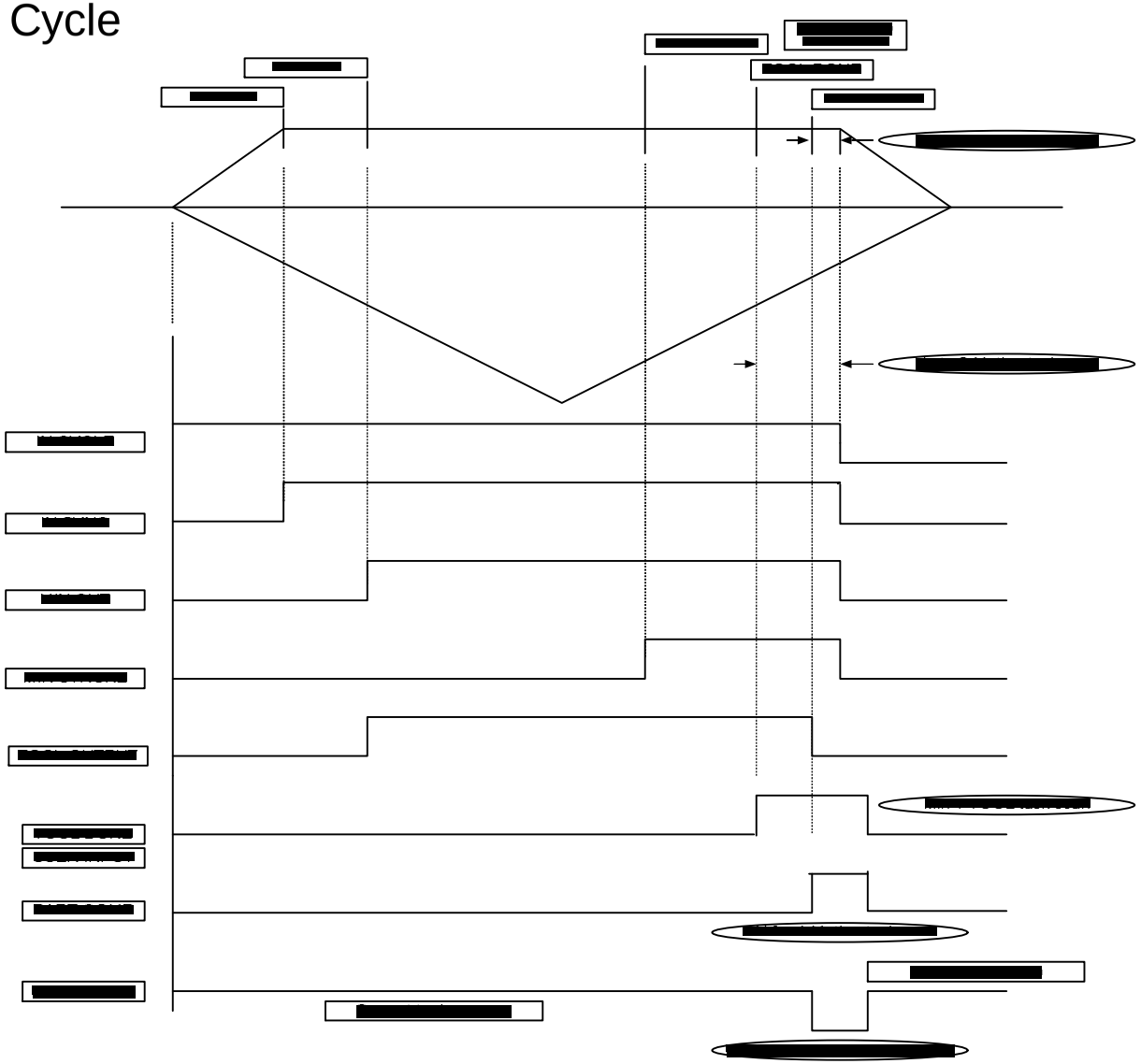
Cut Process Cycle



System Concept for Flying Shear (4) Cut Types

- The following Cut Types are currently supported
  - Production Cut – retrieve Part data and execute
  - Crop Cut – retrieve Crop cut data and execute w/APS*
  - Immediate Cut – Immediately lock on to material and cut w/APS*
  - Inhibit Cut – Blocks programmed cut cycle, Immediate Cut on release
  - Test Cut – retrieve Test cut data and execute

- Advanced Cut Types
  - Product Registration – Modify Part length dependent on register mark
  - Bad Material – Modify Production cycle dependent on material quality

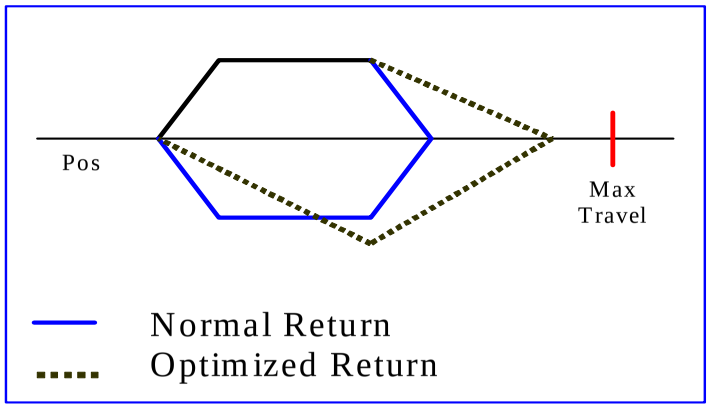
*** APS = Auto Production Start**

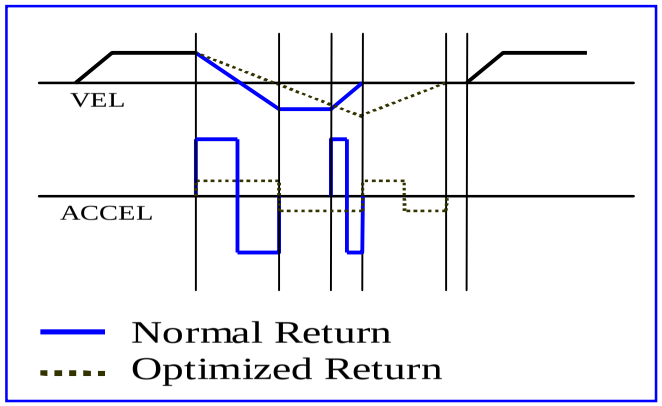
System Concept for Flying Shear (5) Short Part

- Short Parts occur when the carriage is not able to come back fully to the Return Position before the next cut position approaches:
- Factors that have the greatest influences are:
  - Return Velocity*
  - Return Acceleration (also used for Sync Acceleration)*
  - Material Speed*
  - Part Length*
  - Min Cut Position and Min Stroke Position
- The most critical factor in making a successful cut is the Total Sync Time required to complete the cut cycle based on the available travel.
  - Tool Time (Tool Date), Max Travel Limit, Return Acceleration and material speed are used to calculate if sufficient dynamics are available to make a cut based on the current settings.
- Cut-Point Creeping - defines the movement of cut-point closer to the Max Travel Limit during successive cuts and will eventually stop the system with a controlled stop (Error: Tool Cycle Limit or Insufficient Dynamics)
- Single-Step Lock-on is used during Short Part Processing

System Concept Flying Shear (6) Optimized Return

- Optimized Return is an acceleration optimized profile that is used to minimize the power requirements or lower the mechanical wear on the carriage during movement to the Return Position.
- The return profile begins when the cut has been completed and the carriage is desynchronized from the material and ends when the return position has been reached. Automatically disabled for short parts.
- When enabled (set Tool Return Type = 1) the following factor used to determine the shape of the return profile:
  - No more then 80% of return travel time
  - No more then 80% of max travel
  - No Less then 10% of return velocity





Hardware / System Requirements

Hardware / Software Requirements

- Drive Firmware - FWA-INDRV*-MPH-04V20 or higher
- Drive Hardware
  - Amplifier - HCS02.1**
  - Control Section
    - Parallel I/O - CSH01.2C-PL-EN1-EN2-**
    - ProfiBus - CSH01.2C-PB-EN1-EN2-**
  - Motor - As required

- VCP 08.2**

- Software (built with the following FWS)
  - IndraWorks MLD - 05V02.0011
  - IndraLogic Version - 1.60.2375
  - VI Composer - 2.02.00198

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Drive and System Commissioning

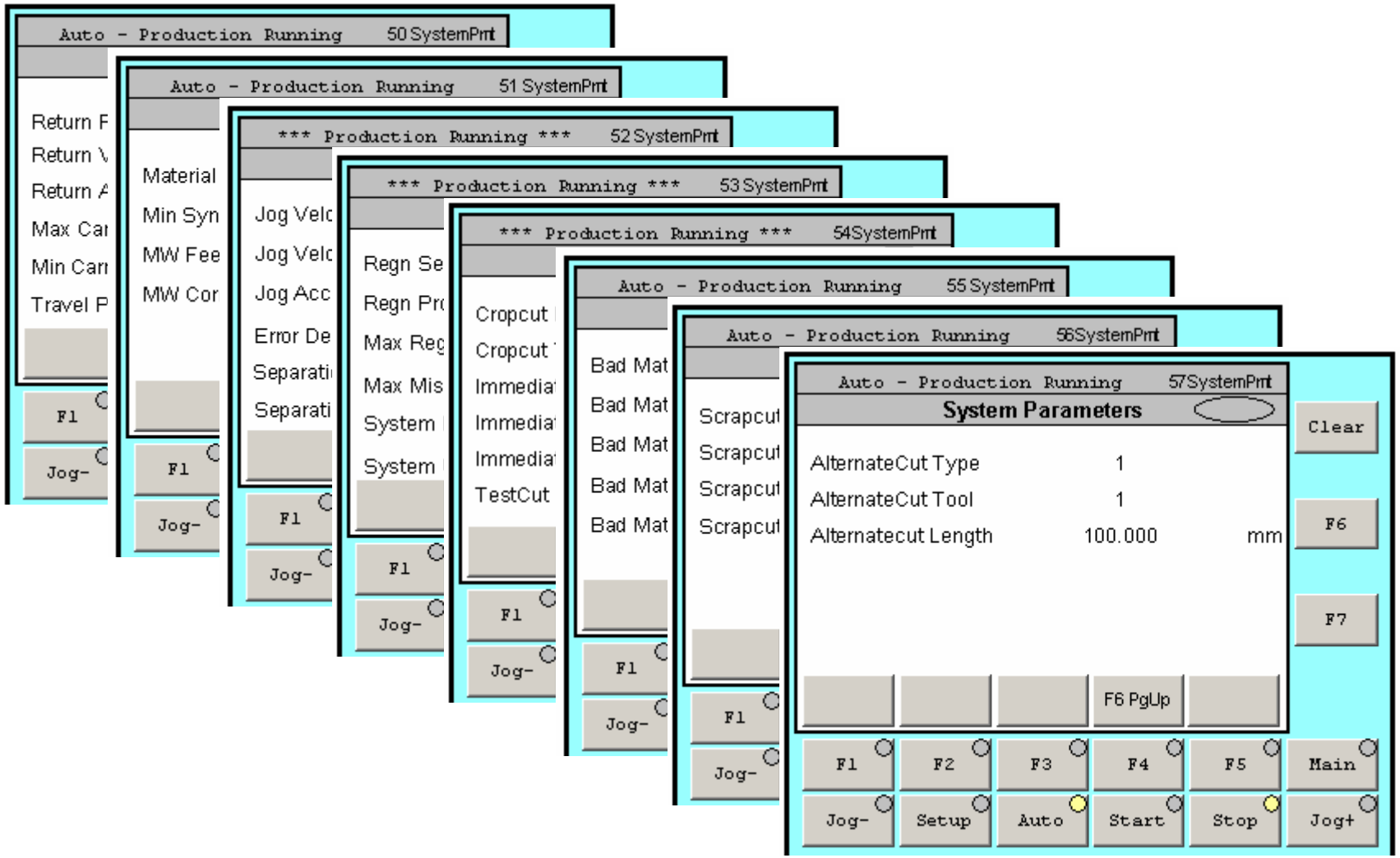
Basic Configuration (1) Drive Setup

- Insert MMC card and power on Drive
- Establish Ethernet connection between Drive and IndraWorks
- From IndraWorks or VCP place the drive into Parameter mode then:
  - Base parameter load
  - Configure the drives mechanical parameters (Gear ratio, Feed Constant, Travel Limits, Homing, etc…)
  - Configure the drives MW encoder
  - Configure P-0-0159 MW encoder feed constant
- From IndraWorks or VCP place the system into Run mode then:
  - System Drive Parameter Base load automatically executes
    - S-0-0026/27/328/329 Digital I/O X15
    - P-0-0300/301/302 X31/32 I/O
    - P-0-4080/4081/4084 ProfiBus X41
    - S-0-0076/44/160/86/756 Scaling
    - S-0-0426/ Probe signal
    - P-0-0750/765 Master Data
- Drive should now in Bb ready for power

Basic Configuration (2) Flying Shear parameters

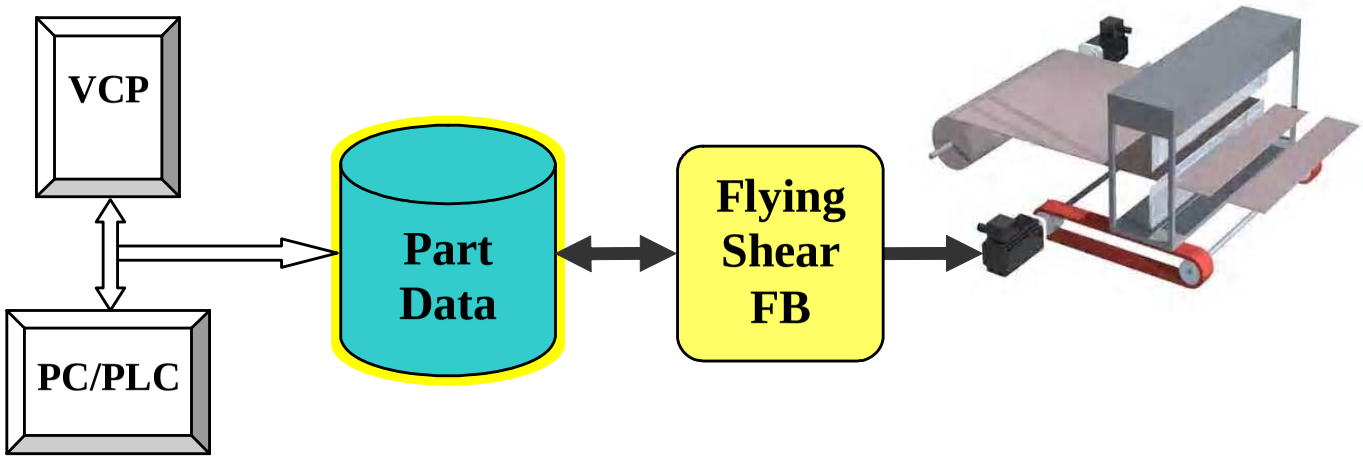
- Configure FS System parameters (VCP, IndraLogic or ProfiBus) :
  - Return Position, Velocity, Acceleration – std. return profile
  - System Software travel limits – system limits, make smaller than drive
  - Travel Pulse Distance – pulses Output Bit.04 (100ms)
  - Min Sync Distance – smallest allowed sync window
  - MW Feed constant – read only from P-0-0159
  - MW Correction Factor – allows corrections to Feed constant
  - Jog Fast/Slow Velocity and Acceleration – jog settings
  - Error Deceleration – rate used during error stop conditions
  - Separation Velocity & Acceleration – separation between parts
  - Registration Sensor Offset / Enable / Max Correction / Missed marks – common registration parameters
  - System Language – set language including drive
  - System Units – read from drive
  - Special Cut Data (CropCut, ImmediateCut, TestCut)
  - Bad Material Processing Data (Scrap Cut, Alternate Cut)

Basic Configuration (2) Flying Shear parameters



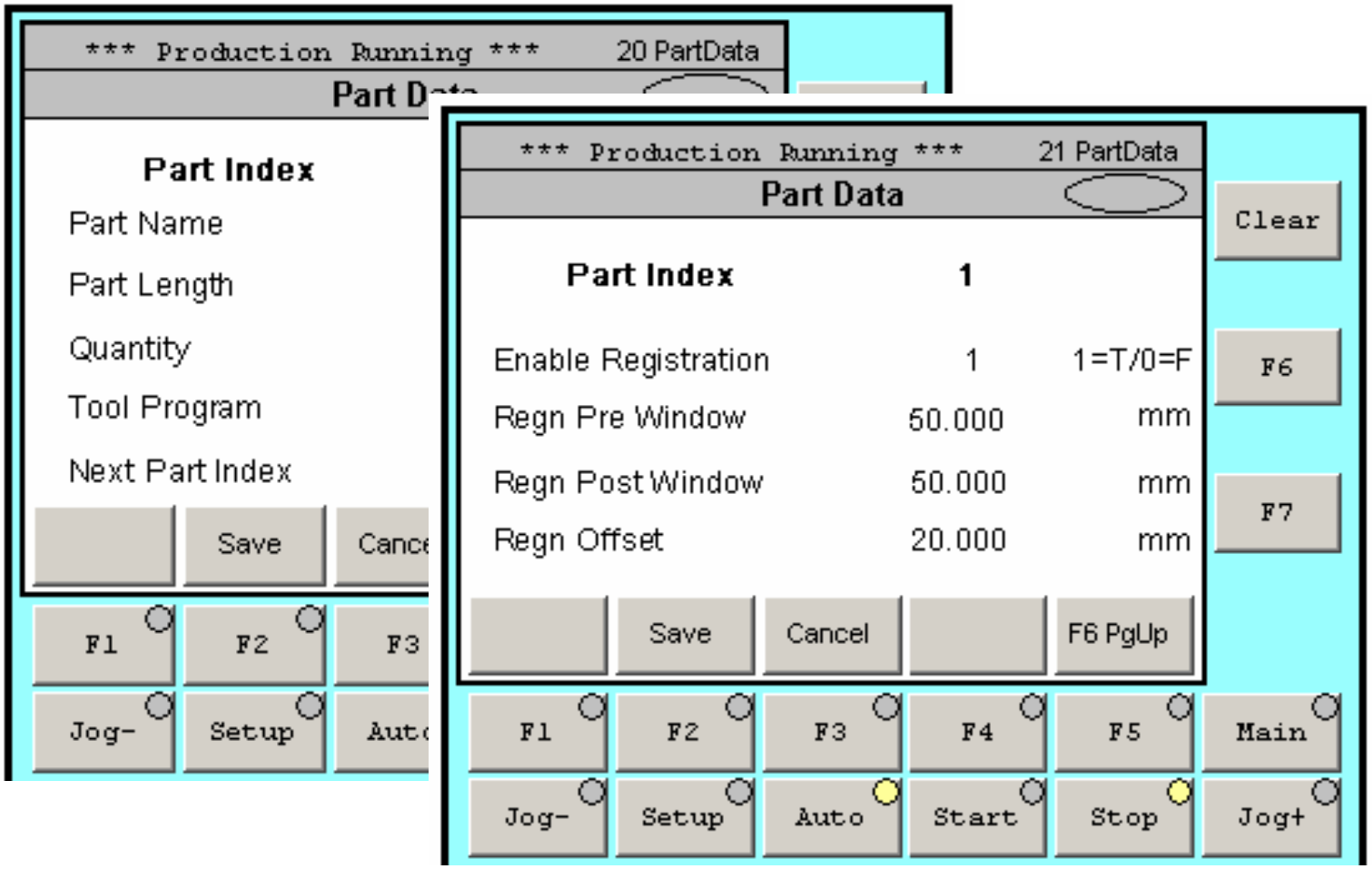
Basic Configuration (3) Part Data

- Part Date describes the attributes of the part (i.e. length, quantity, etc…)
- The System contains 100 part profiles maintain in retained memory.
- During production these files are retrieved for processing
- Changes to part data are carry out on the **next** cut cycle
- Special Part profiles are maintain for CropCut, ImmCut, TestCut



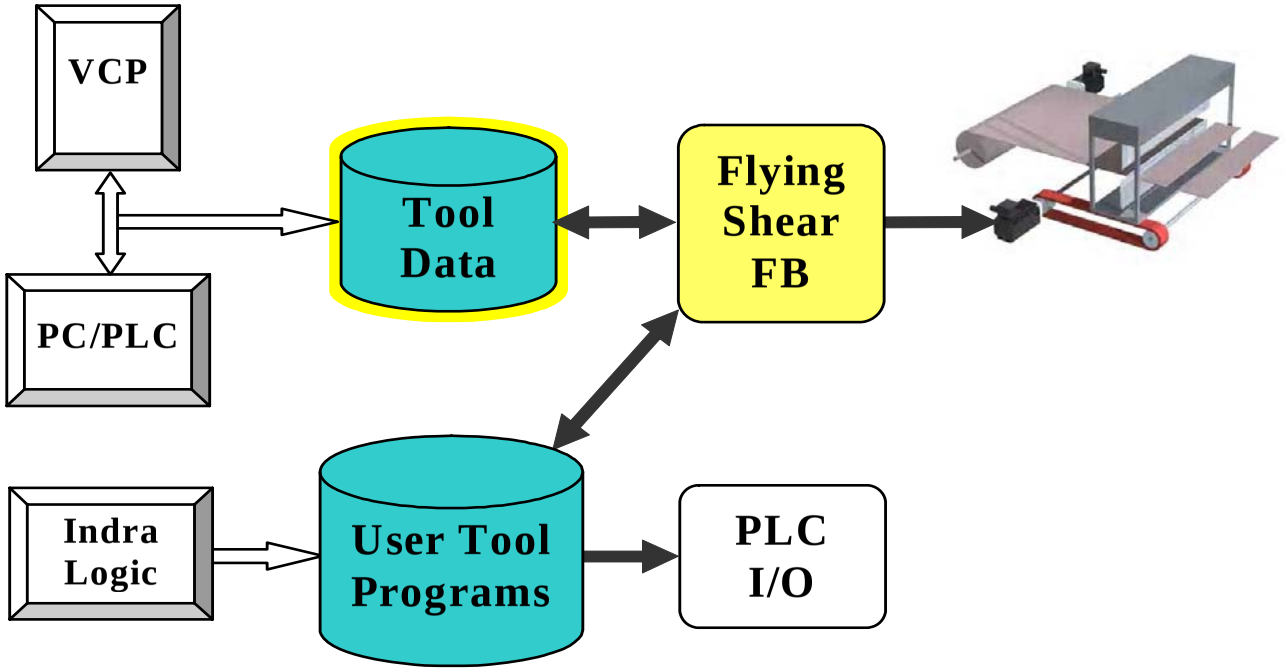
Basic Configuration (3) Part Data

- The VCP part data screens provides an easy method to enter data.



Basic Configuration (4) Tool Data

- Tool Date describes the attributes of the cut (i.e. offsets, time, etc…)
- The System contains 20 User Tool profiles maintain in retained memory.
- During production [Part_Data.Tool_Program] points to the tool data that will be used for the next cut
- Changes to tool data are carry out on the next cycle
- Special Tool profiles are maintain for Emergency Retraction, ImmCut



Basic Configuration (4) Tool Data

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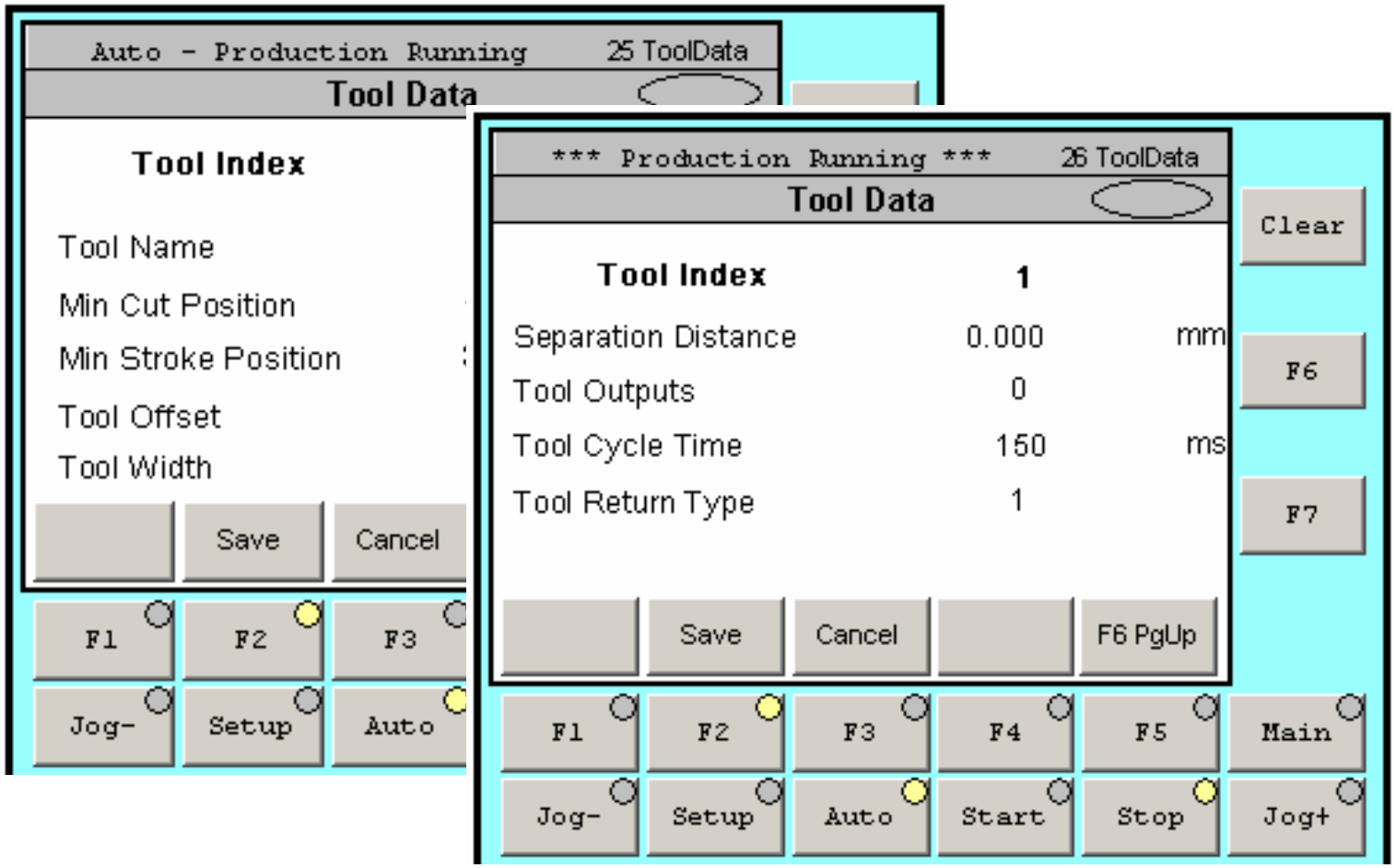
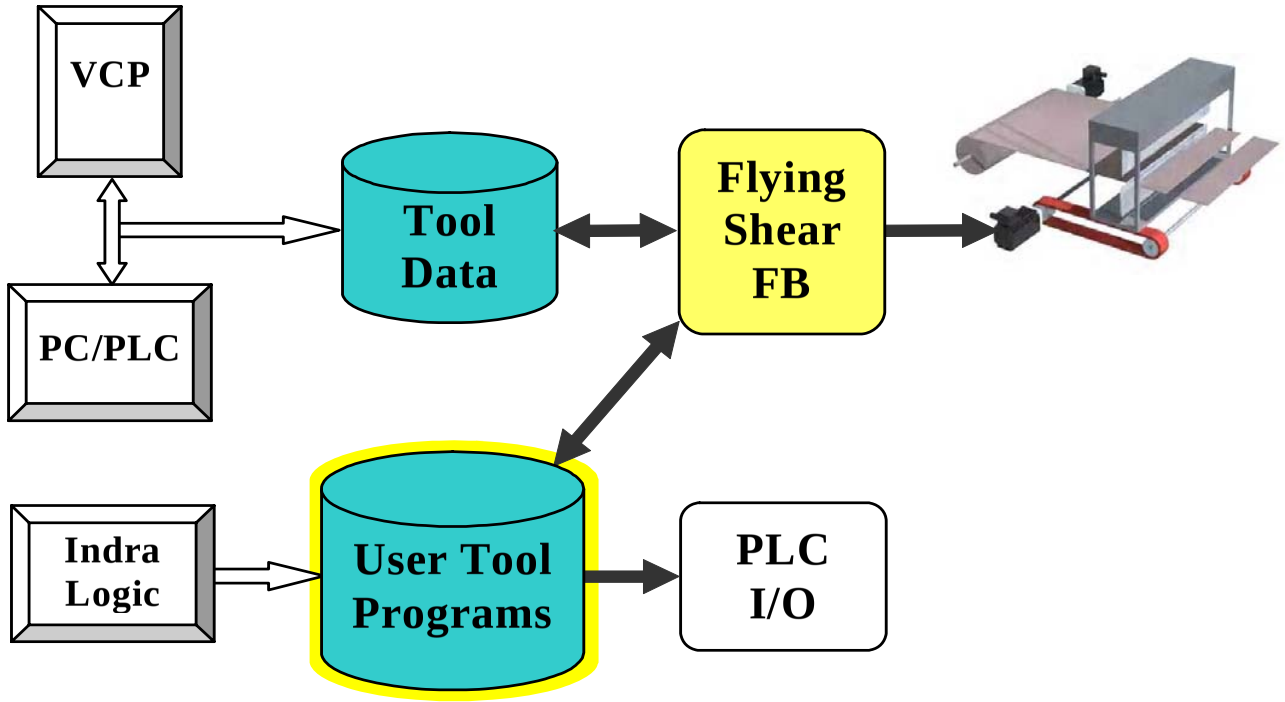


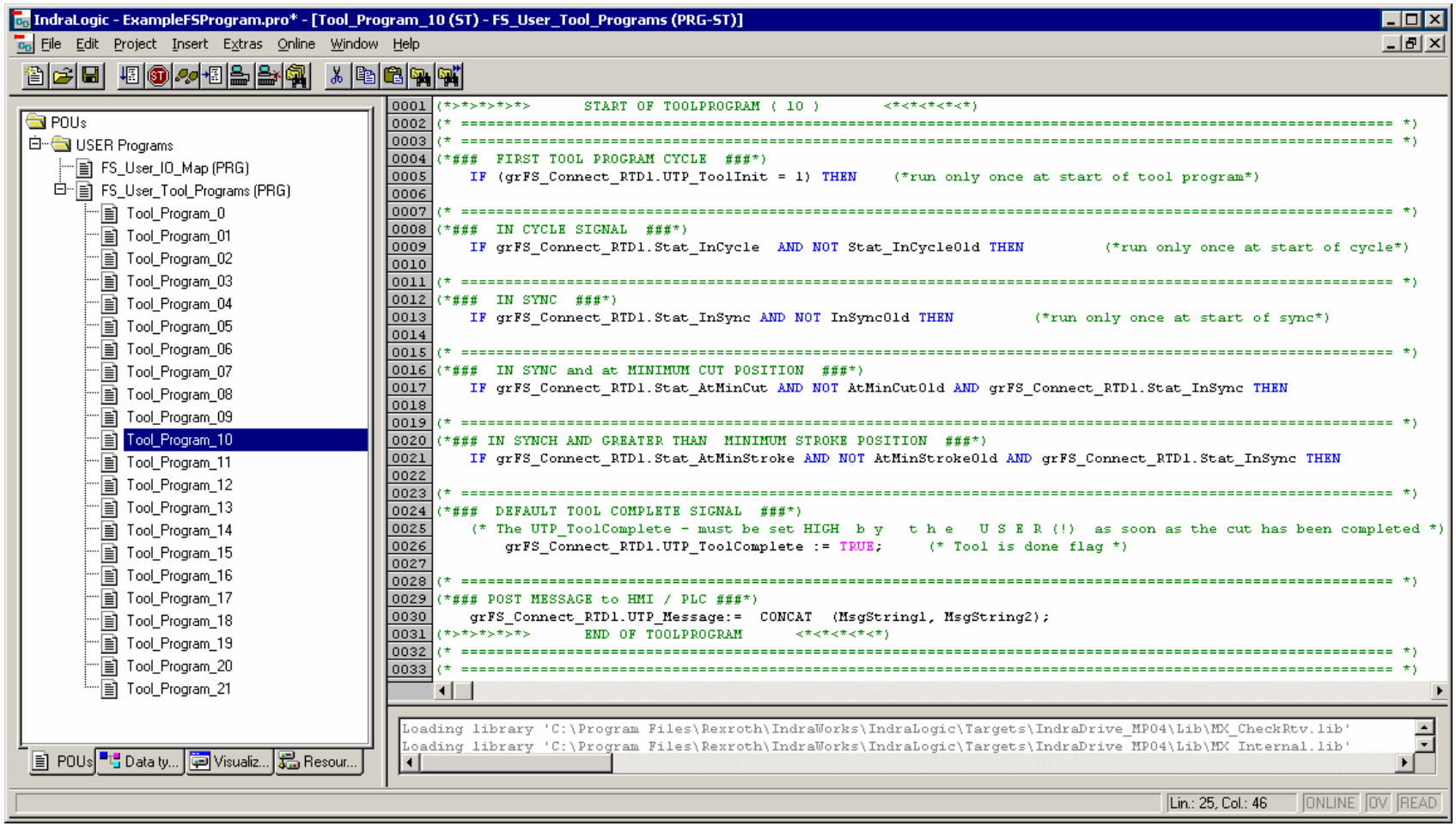
Basic Configuration (5) Tool Program

- Tool Programs describe special processes needed to make a cut
- The System provides 20 User_Tool_Program templates
- During production [Part_Data.Tool_Program] points to the optional User_Tool_Program that the will run in the PLC task (10ms)
- Changes to User_Tool_Program require IndraLogic to edit and download
- The Emergency Retraction, ImmCut programs must be edited



Basic Configuration (5) Tool Program

- Template for User Tool_Program_10



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System operation

Basic Operation (1) System Command Signals

- Control Signals -
  - Parameter – sets drive into P-2 (must be in manual mode, drive enable OFF)
  - Manual – (Auto input set LOW)
    - Homing – commands the carriage to reference (Abs Enc – does nothing)
    - Jog Plus and Jog Minus – level commands the carriage to jog +/-
    - Jog Speed Fast – HIGH selects fast jog speed, LOW selects slow speed
    - Immediate Cut - commands the carriage to sync to material then cut
  - Auto – (Auto input set HIGH and drive enable ON and no drive errors)
    - Stop – not Stop signal must be high to run normal production and low to stop
    - Start – momentary signal (pulse) starts production
    - Crop Cut – momentary signal (pulse) starts crop cut *
    - Immediate Cut – momentary signal (pulse) starts Immediately lock to material *
    - Inhibit Cut – positive level blocks cut cycle, Immediate Cut on release
    - Test Cut – momentary signal (pulse) injects a test cut as next cut cycle
  - Test Mode – Simulate material moving to test production/system settings
    - Enable Test Mode – sets Virtual Master as the master position input
    - Run - positive level runs VM, Stops on release

*** APS = Auto Production Start**

Basic Operation (2) Global Input Signals

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FS_CONNECT_RTD - GLOBAL INPUT SIGNALS

Cmd_CropCut (BOOL)	- Commands the CropCut sequence to start (EDGE)
Cmd_DrivePower (BOOL)	- Commands the Drive to be enabled (LEVEL)
Cmd_DriveReset (BOOL)	- Commands the Drive error to be cleared (EDGE)
Cmd_ErrorClear (BOOL)	- Commands the FS error to be cleared (EDGE)
Cmd_EmergencyHalt (BOOL)	- Commands the carriage to halt at ErrorDecl (EDGE)
Cmd_HomeDrive (BOOL)	- Commands the Drive to start the homing sequence (EDGE)
Cmd_ImmediateCut (BOOL)	- Commands the ImmediateCut sequence to start (EDGE)
Cmd_InhibitCut (BOOL)	- Commands the current cut to be Inhibited (LEVEL)
Cmd_JogMinus (BOOL)	- Commands the carriage to jogging minus direction (LEVEL)
Cmd_JogPlus (BOOL)	- Commands the carriage to jogging plus direction (LEVEL)
Cmd_JogSpeedFast (BOOL)	- Selects the fast jog speed when high (LEVEL)
Cmd_ModeAuto (BOOL)	- Commands the FB to goto Auto mode from Manual (LEVEL)
Cmd_ModeParameter (BOOL)	- Commands the Drive to enter parameter mode (P2) (LEVEL)
Cmd_nStop (BOOL)	- Commands the FS to stop processing if not active (LEVEL)
Cmd_Resume (BOOL)	- Commands the FS to resume a active production run (EDGE)
Cmd_StartNew (BOOL)	- Commands the FS to start a new production run (EDGE)
Cmd_Start (BOOL)	- Commands the FS to start processing if active (EDGE)
Cmd_StartingPartIndex (DINT)	- Selection for the Starting Part Index for first Cmd_Start
Cmd_StartProductionRun (BOOL)	- Internal Command to execute Cmd_StartingPartIndex (EDGE)
Cmd_StartSeparation (BOOL)	- Commands the start of separation offset profile (EDGE)
Cmd_TestCut (BOOL)	- Commands FS to process a Test Cut as next part (EDGE)
Cmd_TestModeEnable (BOOL)	- Commands switch from RealMaster to VirtMaster (LEVEL)

Basic Operation (3) System Status Signals

- Status Signals
  - System Status
    - Active Modes - Auto, Manual, Parameter, Test
    - Current Master / Slave Position and Velocity
    - Error status – Error Bit, ErrorID, ErrorIdent, Travel limits
    - Warning status – Warning Bit, ErrorID, ErrorIdent
  - Manual – (when Auto input is LOW)
    - Drive Ready, Drive Error, Drive Message
    - Homed –carriage referenced (both Inc and Abs Encoders)
    - Jog Plus, Jog Minus, Jog Speed Fast – actively jog +/- at selected speed
  - Auto – (when Auto input is HIGH)
    - Production Active - running normal production
    - Crop Cut / Immediate Cut / Inhibit Cut / Test Cut – Active
    - Operation signals – InCycle, InSync, MinCut, MinStroke, Returning, Part Complete
    - Tool_Output – dedicated output indicating the carriage is in sync and ready to start cut
    - Tool_Done – dedicated input indicating the tool is complete and carriage can return home
    - Product Registration – Missed mark count and Missed mark error bit
    - Bad Material – ScrapCut, SalvageCut, AlternateCut, NormalCut, Cut counts, Cut Length

Basic Operation (4) Global Output Signals

FS_CONNECT_RTD - GLOBAL OUTPUT SIGNALS

Stat_AlternatePartActive (BOOL)	- Indicates the Alt Part command is active
Stat_AlternatePartCount (DINT)	- Indicates the number of Alt Part made
Stat_AtMinCut (BOOL)	- Indicates the MinCutPosition has been reached
Stat_AtMinStroke (BOOL)	- Indicates the MinStrokePosition has been reached
Stat_AutoModeActive (BOOL)	- Indicates the MinCutPosition has been reached
Stat_CommandType (UINT)	- Indicates which command is active
Stat_CropCutActive (BOOL)	- Indicates the CropCut command is active
Stat_CurrentCount (DINT)	- Indicates Current number of parts completed
Stat_CurrentMasterPosition (REAL)	- Indicates Current relative position of material
Stat_CurrentMasterVelocity (REAL)	- Indicates Current velocity of material
Stat_CurrentSlavePosition (REAL)	- Indicates Current absolute position of carriage
Stat_CurrentSlaveVelocity (REAL)	- Indicates Current velocity of carriage
Stat_DriveHomed (BOOL)	- Drive has been referenced
Stat_DrivePowerOn (BOOL)	- Drive has power
Stat_Error (BOOL)	- Flying Shear System has an error
Stat_Error_FSFB (BOOL)	- Flying Shear FB has an error
Stat_Error_ModeFB (BOOL)	- Flying Shear ModeFB has an error
Stat_Error_ToolProgram (BOOL)	- Flying Shear Tool Program has an error
Stat_ErrorBlink (BOOL)	- Timer pulse used to switch status messages
Stat_ErrorID (DINT)	- ERROR ID ERROR_CODE(ENUM)
Stat_ErrorIdentTable (DINT)	- ERROR ID Table ERROR_TABLE(ENUM)
Stat_ErrorIdentAdditional1 (DINT)	- ERROR ID ADD1 see FB constants for codes
Stat_ErrorIdentAdditional2 (DINT)	- ERROR ID ADD2 see FB constants for codes

Basic Operation (5) Global Output Signals

FS_CONNECT_RTD - GLOBAL OUTPUT SIGNALS

Stat_HomingActive (BOOL)	- Indicates the Homing command is active
Stat_ImmediateCutActive (BOOL)	- Indicates the ImmediateCut command is active
Stat_InhibitCutActive (BOOL)	- Indicates the Inhibit Cut command is active
Stat_InCycle (BOOL)	- Indicates the carriage is starting the sync process
Stat_InSync (BOOL)	- Indicates the carriage is in sync with the material
Stat_JogMinusActive (BOOL)	- Indicates the carriage is jogging in the minus direction
Stat_JogPlusActive (BOOL)	- Indicates the carriage is jogging in the plus direction
Stat_LastCutLength (REAL)	- Indicates the approximate length of the last part
Stat_ManualModeActive (BOOL)	- Indicates the system is in Manual mode
Stat_MaxPositionLimit (BOOL)	- Indicates the carriage has reached positive travel limit
Stat_MaxTravel (REAL)	- Provides the carriage positive travel limit position
Stat_MinTravel (REAL)	- Provides the carriage negative travel limit position
Stat_MinPositionLimit (BOOL)	- Indicates the carriage has reached negitive travel limit
Stat_MissedMarkCount (DINT)	- Number of missed registration marks before error
Stat_MissedMarkError (BOOL)	- Indicates the missed marks count has been reached
Stat_NormPartActive (BOOL)	- Indicates the requested Part command is active
Stat_ParameterModeActive (BOOL)	- Indicates the system is in Parameter mode
Stat_PartComplete (BOOL)	- Indicates that the current part is completed
Stat_PartDataReady (BOOL)	- Indicates that the current Part Data is ready
Stat_ProductionActive (BOOL)	- Indicates that the current Part is in process
Stat_ReturnActive (BOOL)	- Indicates the carriage is moving to the return position

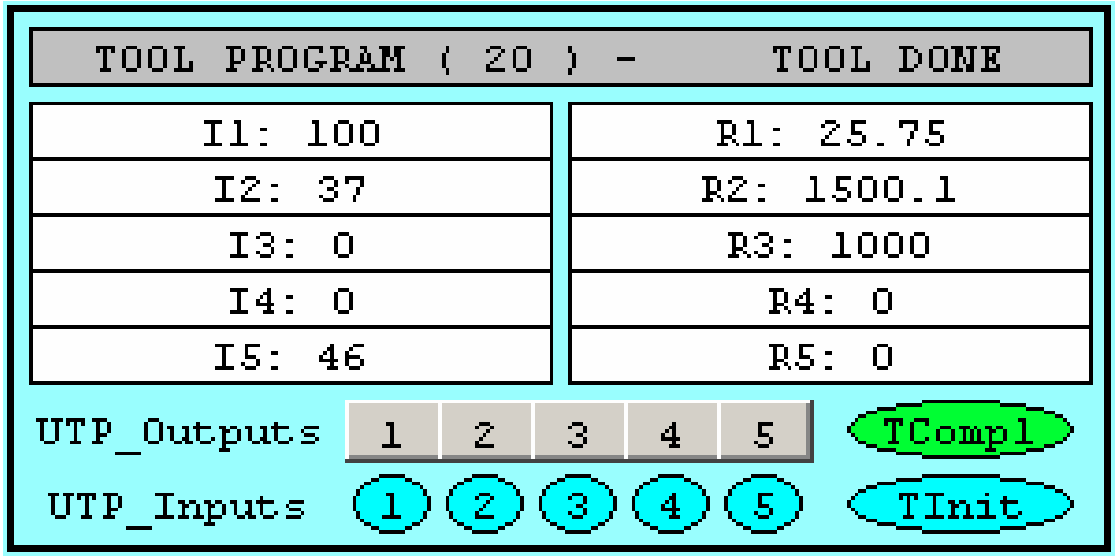
Basic Operation (6) Global Output Signals

FS_CONNECT_RTD - GLOBAL OUTPUT SIGNALS

Stat_SalvagePartActive (BOOL)	- Indicates a Salvage Part is being made
Stat_SalvagePartCount (DINT)	- Indicates the number of Salvage Part made
Stat_SalvagePartLength (REAL)	- Indicates the length of the Salvage Part made
Stat_ScrapPartActive (BOOL)	- Indicates the Scrap Part command is active
Stat_ScrapPartCount (DINT)	- Indicates the number of Scrap Part made
Stat_SeparationDone (BOOL)	- Separation offset profile is complete
Stat_TestCutActive (BOOL)	- Indicates the Test Cut command is active
Stat_TestModeActive (BOOL)	- Indicates the TestMode is active, Virt Master
Stat_ToolComplete (BOOL)	- Indicates Tool cycle completed (USER ACTIVATED)
Stat_ToolCycleState (DINT)	- Indicates the Tool Cycle State
Stat_ToolCycleTime (REAL)	- Indicates the Time of the last tool cycle
Stat_ToolDataReady (BOOL)	- Indicates the Tool data for the current part is ready
Stat_ToolOutput (BOOL)	- Indicates Tool can start (In-Sync and MinCut Position
Stat_ToolRunTime (REAL)	- Displays the Tool Run Time for last cut cycle
Stat_TravelPulse (BOOL)	- Indicator pulse every parameter-TravelPulseDistance
Stat_WarningErr (BOOL)	- Flying Shear System has an non-fatal error

Basic Operation (7) Global User Tool Signals

- The system has been preconfigured with a set of user I/O and Variables to allow data to be passed easily between the User_Tool_Program, Parallel I/O, HMI device (VCP, etc…), user PLC and other devices.
- Data is retained and available on power-up
- Data includes (5- Inputs, 5-Outputs, 5-DIntegers, 5-Reals, 1-Message)
- The Inputs/outputs are mapped to X-15 (Parallel I/O bits 11-15) or for ProfiBus real-time data words P-0-1390 / P-0-1410 (bits 11-15)



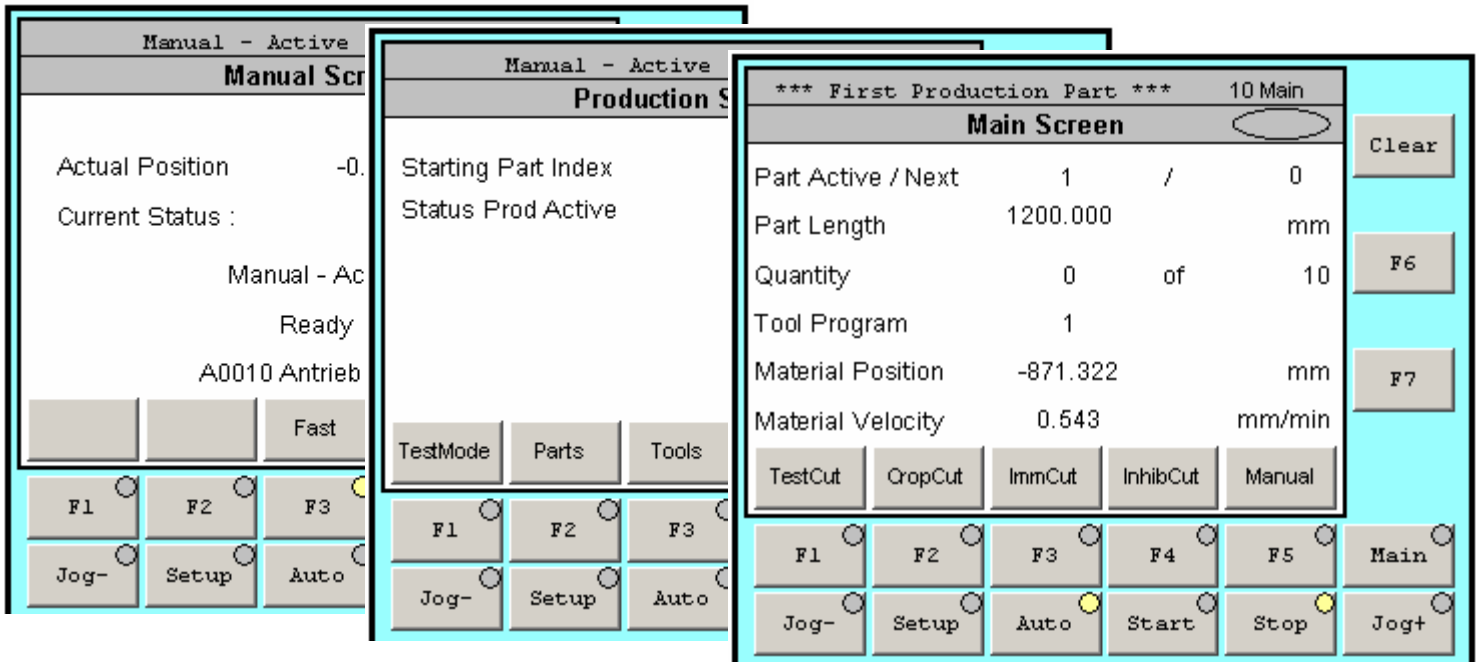
Basic Operation (8) Global User Tool Signals

FS_CONNECT_RTD - GLOBAL **U**SER **T**OOL **P**ROGRAM SIGNALS

UTP_Input1 (BOOL)	- User digital Input_1 to PLC or HMI
UTP_Input2 (BOOL)	- User digital Input_2 to PLC or HMI
UTP_Input3 (BOOL)	- User digital Input_3 to PLC or HMI
UTP_Input4 (BOOL)	- User digital Input_4 to PLC or HMI
UTP_Input5 (BOOL)	- User digital Input_5 to PLC or HMI
UTP_Output1 (BOOL)	- User digital Output_1 to PLC or HMI
UTP_Output2 (BOOL)	- User digital Output_2 to PLC or HMI
UTP_Output3 (BOOL)	- User digital Output_3 to PLC or HMI
UTP_Output4 (BOOL)	- User digital Output_4 to PLC or HMI
UTP_Output5 (BOOL)	- User digital Output_5 to PLC or HMI
UTP_IntVar01 (DINT)	- User Integer_1 Variable to PLC or HMI
UTP_IntVar02 (DINT)	- User Integer_2 Variable to PLC or HMI
UTP_IntVar03 (DINT)	- User Integer_3 Variable to PLC or HMI
UTP_IntVar04 (DINT)	- User Integer_4 Variable to PLC or HMI
UTP_IntVar05 (DINT)	- User Integer_5 Variable to PLC or HMI
UTP_RealVar01 (REAL)	- User Real_1 Variable to PLC or HMI
UTP_RealVar02 (REAL)	- User Real_2 Variable to PLC or HMI
UTP_RealVar03 (REAL)	- User Real_3 Variable to PLC or HMI
UTP_RealVar04 (REAL)	- User Real_4 Variable to PLC or HMI
UTP_RealVar05 (REAL)	- User Real_5 Variable to PLC or HMI
UTP_Message : STRING(64);	- User message to PLC or HMI
UTP_ToolComplete (BOOL)	- User Tool Done Signal to I/O Mux_Channel
UTP_ToolInit (BOOL)	- Signal that Tool-Program is in initial run cycle

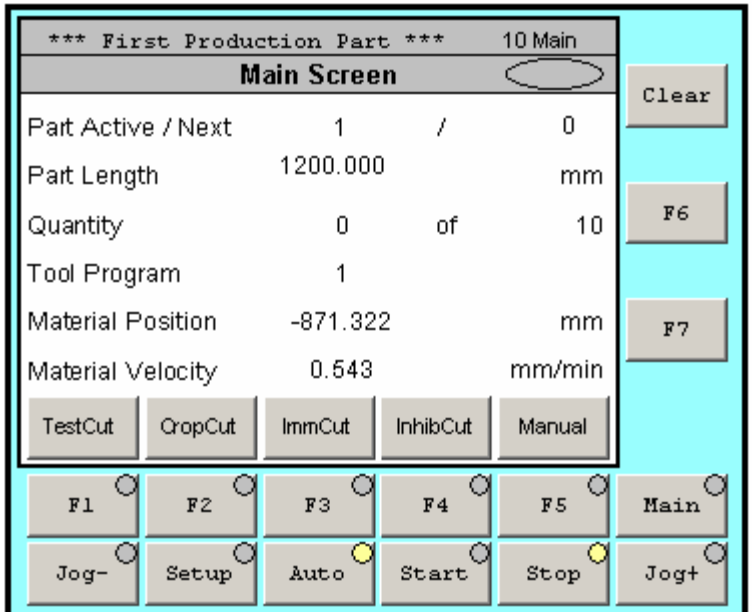
Basic Operation (1) Production Start-up

- Power-up drive and Home axis (VCP Manual Screen)
- Enter a valid starting part index (VCP Production Setup Screen)
- Enable (Auto) mode and (Stop) inputs (VCP Main Screen)
- Start methods
  - Start with forced CropCut – Select F2 button (CropCut)
  - Start with forced ImmediateCut – Select F3 button (ImmCut)
  - Start with auto CropCut – Select (Start) button



Basic Operation (2) Running Production

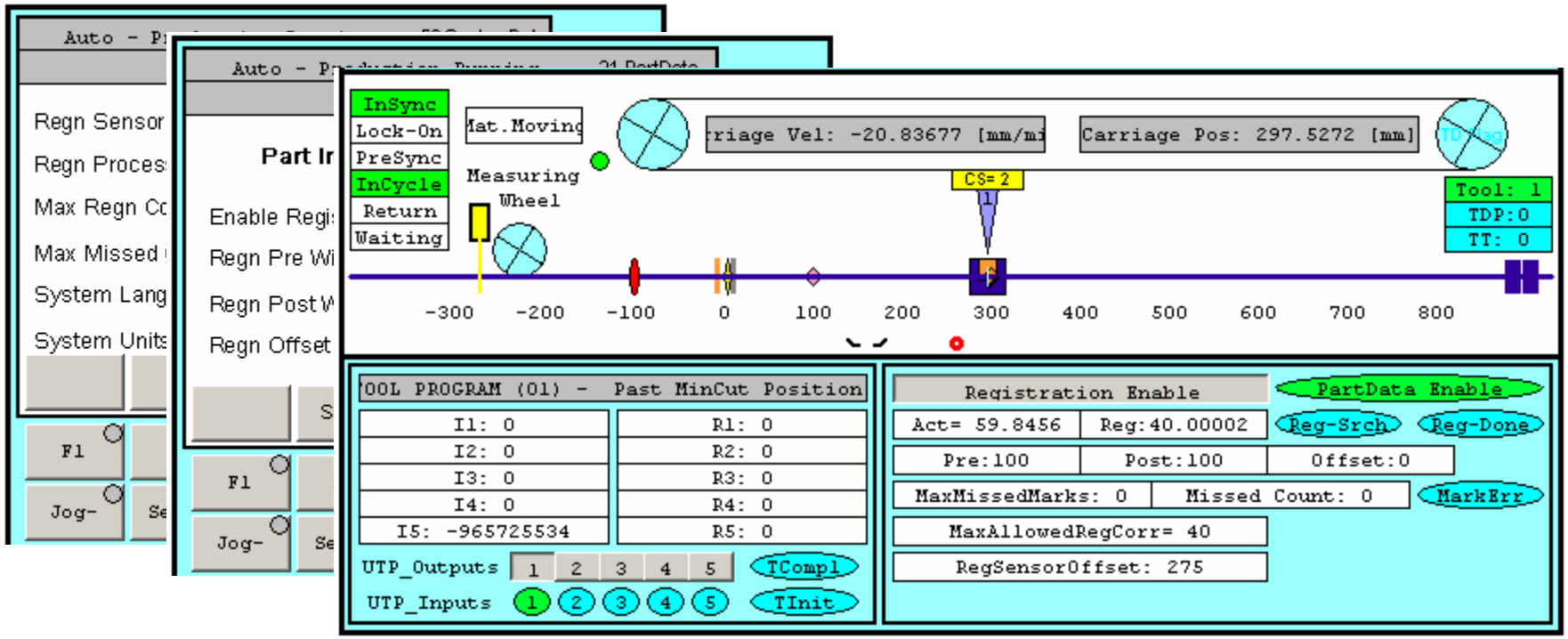
- Production control
  - Inhibit Cut – Select F4 button (InhibitCut) to hold further cuts
  - Test Cut – Select F1 button (TestCut) to force test cut as next part
  - Stop production – deselect Stop button to halt production
  - Restart production – Enable Stop then select Start (auto crop if required)



Basic Operation (3) Registration Control

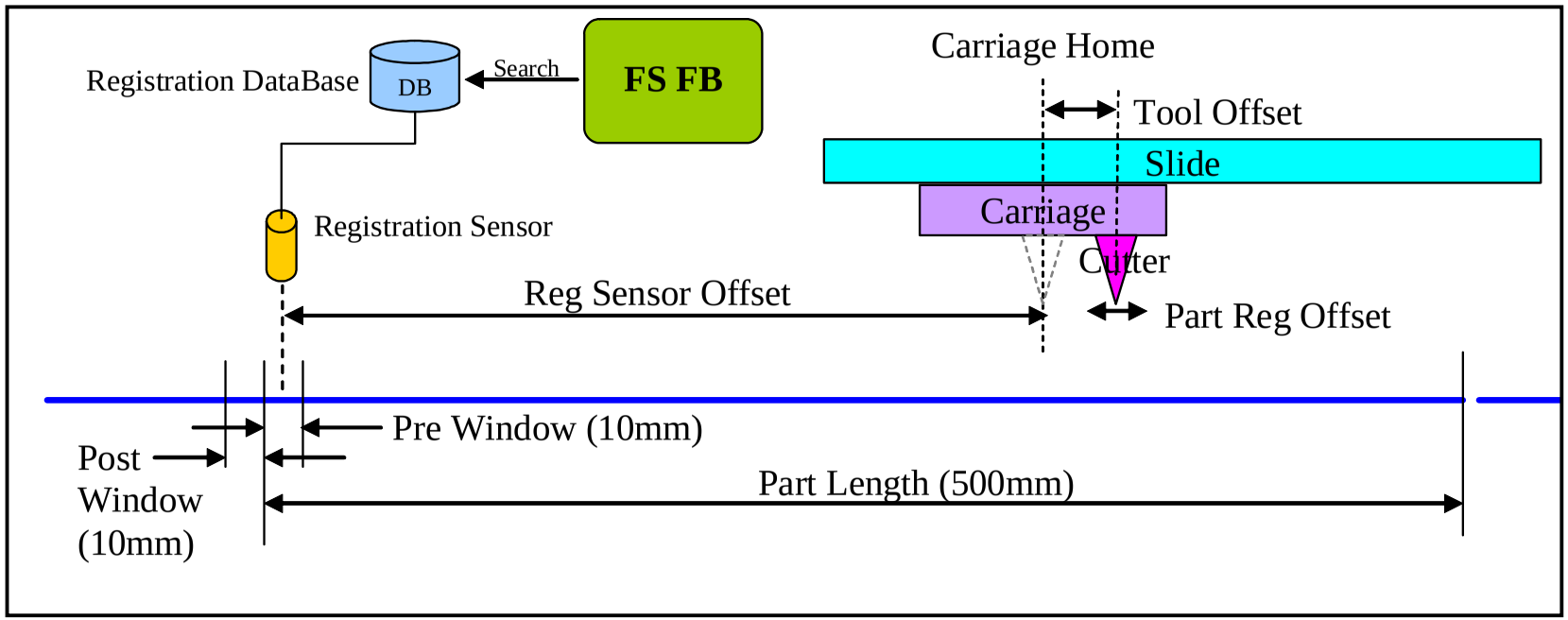
Production with Registration control

- Set Registration Parameters – Sensor Offset, Max Corr, Max Missed, Enable
- Set Part Data – Reg Part Enable, Pre/Post Window, Reg mark Offset
- Run production – The registration database is now being scanned for marks in the user defined window and will correct as defined with the current settings.



Basic Operation (3) Registration Control

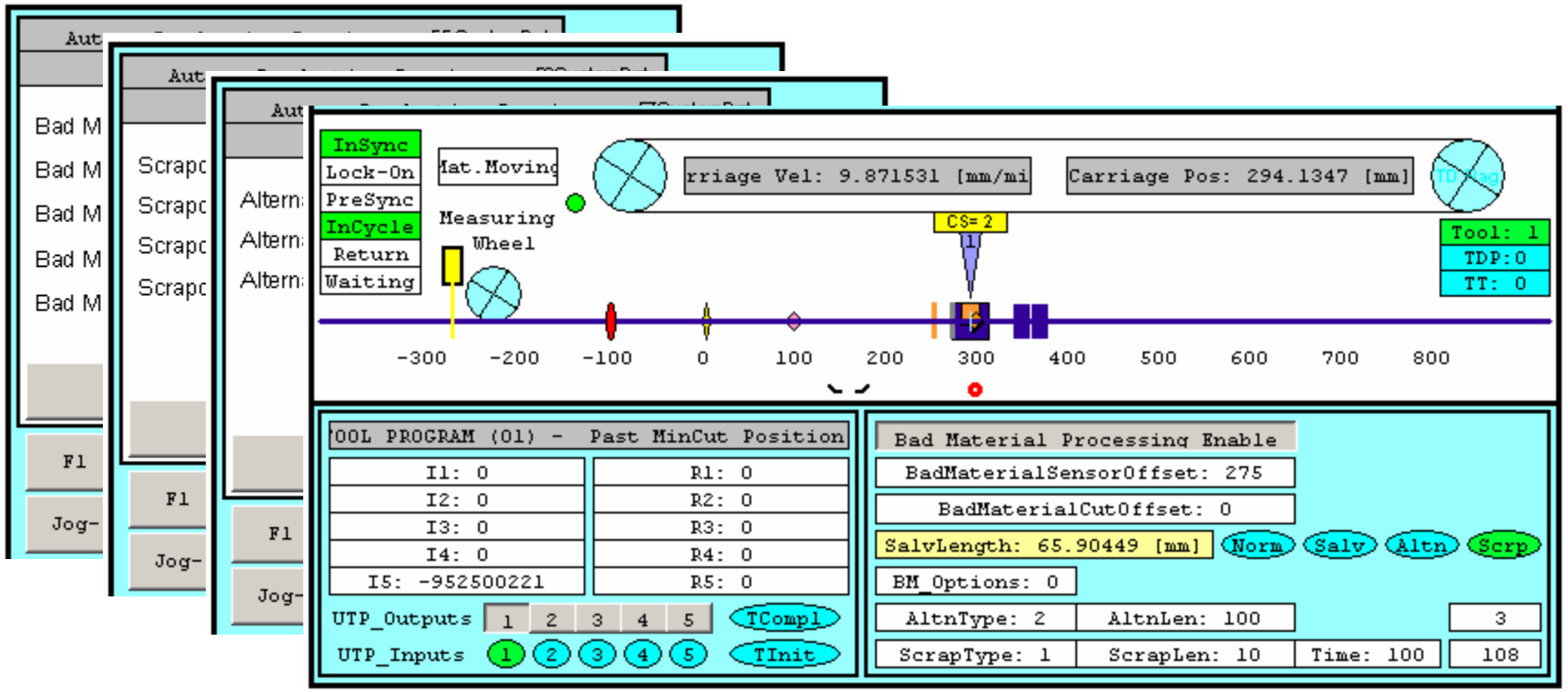
- Registration Positions are stored in a database for later processing (default 20)
- Multi-part registration is supported with the limit of the database size (100 max)
- With each new part a search is made based on requested part length +/- the Pre/Post search window defined in the part data
- Searching for a valid mark is automatically terminated when the requested part length reaches the Sync start position.
- If a mark is NOT found the requested part length will be used
- If a mark is found then the master target position is adjusted accordingly



Basic Operation (4) Bad Material Detection

Production with Bad Material Detection

- Set Bad Material Parameters – Enable, Sensor Offset, Cut Offset, Options (Merge marks, Tool Switch on AltnCut, Tool Switch on ScrapCut)
- Set ScrapCut Data – Type (Length, After, Time), Tool, Scrap length, Time
- Set AlternateCut Data – Type (Disable, Length, SalvageMode), Altn length



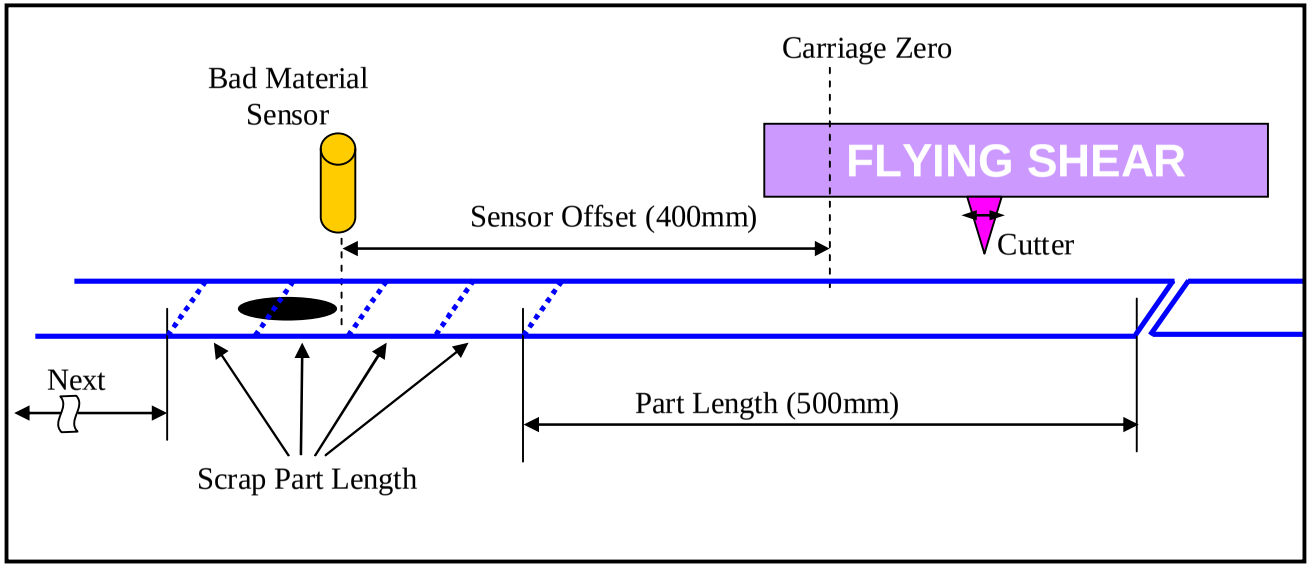
Basic Operation (5) Bad Material Detection 1

Example: ScrapCutType = 0 (length), AltnCut = 0

- Distance from last cut to starting edge of bad material = 619mm
- Length of bad material = 63mm

Parameter Settings:

- ScrapCutLength = 50
- ScrapCutTool = 10
- ScrapCutTime = 0ms
- ScrapCutType = 0
- AlternateCutLength = 0
- AlternateCutTool = 0
- AlternateCutType = 0
- SalvageCutTool = 0
- BadMaterialCutOffset = 5



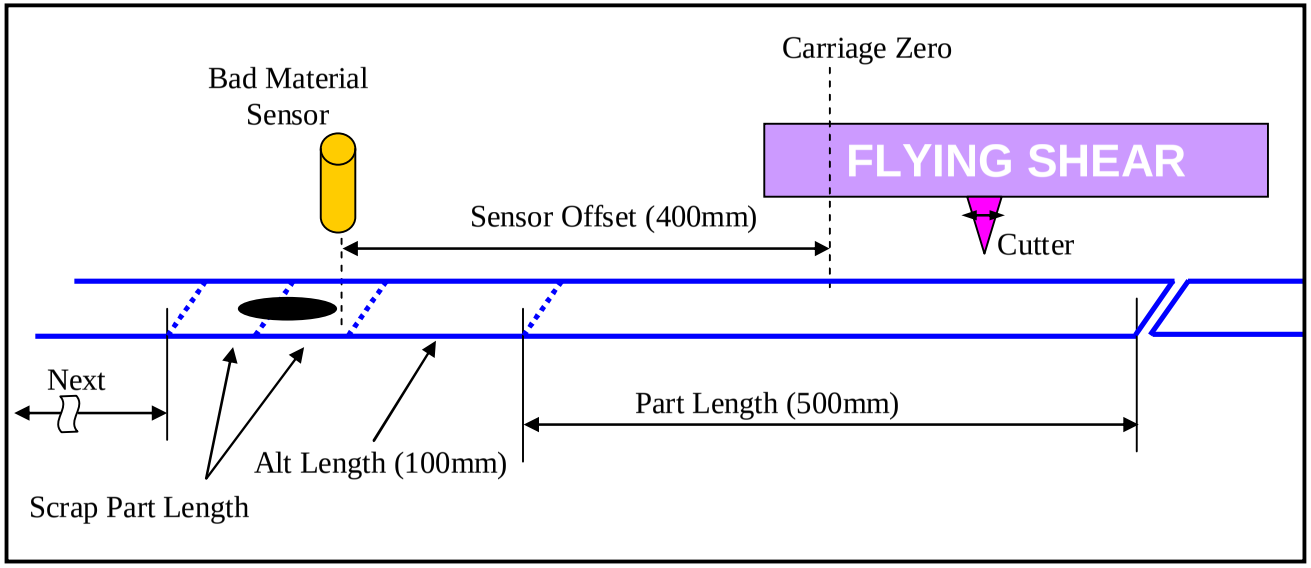
Basic Operation (5) Bad Material Detection 2

Example: ScrapCutType = 0 (length), AltnCut = 1

- Distance from last cut to starting edge of bad material = 619mm
- Length of bad material = 63mm

Parameter Settings:

- ScrapCutLength = 50
- ScrapCutTool = 10
- ScrapCutTime = 0ms
- ScrapCutType = 0
- AlternateCutLength = 100
- AlternateCutTool = 0
- AlternateCutType = 1
- SalvageCutTool = 0
- BadMaterialCutOffset = 5



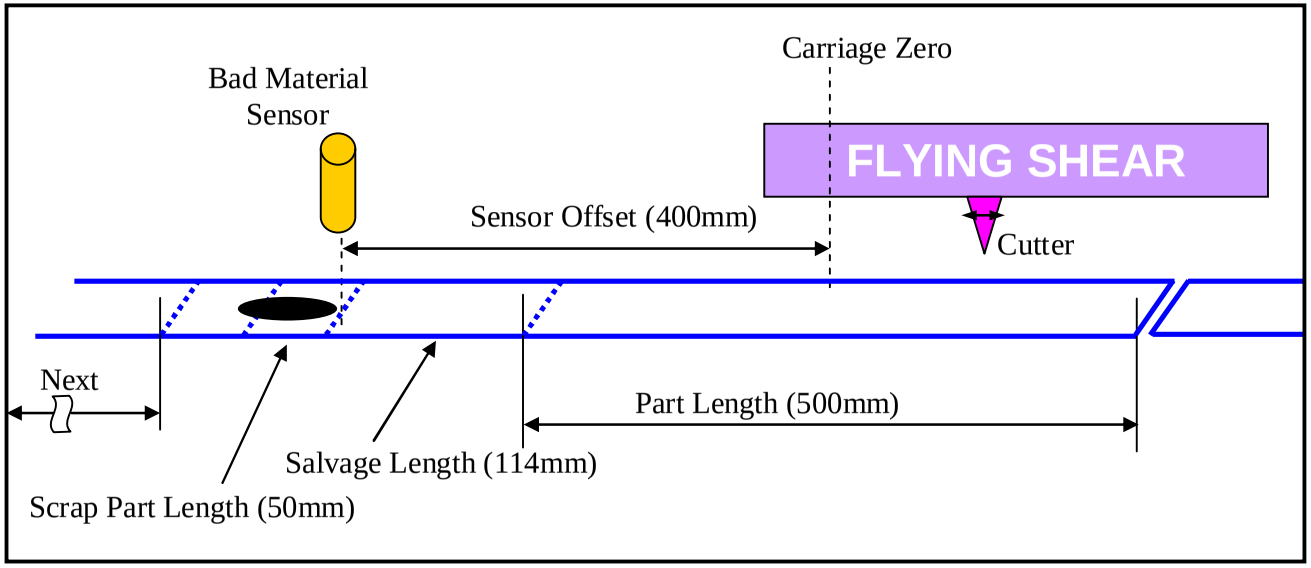
Basic Operation (5) Bad Material Detection 3

Example: ScrapCutType = 0 (length), AltnCut = 2

- Distance from last cut to starting edge of bad material = 619mm
- Length of bad material = 63mm

Parameter Settings:

- ScrapCutLength = 50
- ScrapCutTool = 10
- ScrapCutTime = 0ms
- ScrapCutType = 0
- AlternateCutLength = 0
- AlternateCutTool = 1
- AlternateCutType = 2
- SalvageCutTool = 1
- BadMaterialCutOffset = 5



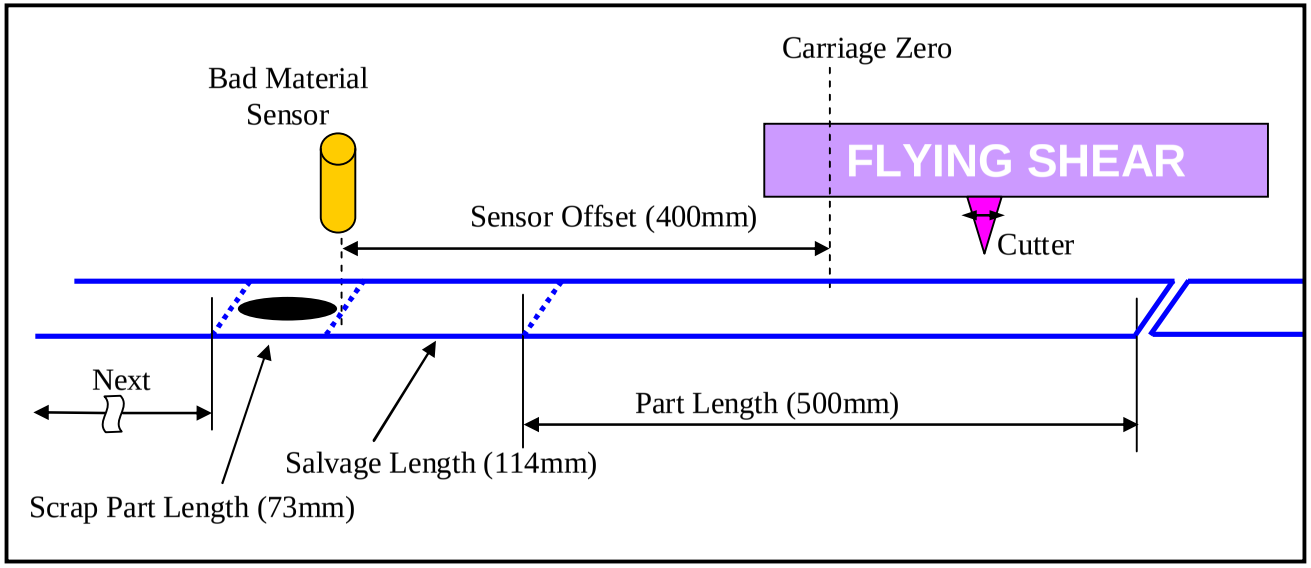
Basic Operation (5) Bad Material Detection 4

Example: ScrapCutType = 1 (After), AltnCut = 2

- Distance from last cut to starting edge of bad material = 619mm
- Length of bad material = 63mm

Parameter Settings:

- ScrapCutLength = 50
- ScrapCutTool = 10
- ScrapCutTime = 0ms
- ScrapCutType = 1
- AlternateCutLength = 0
- AlternateCutTool = 1
- AlternateCutType = 2
- SalvageCutTool = 1
- BadMaterialCutOffset = 5



Basic Operation (6) System I/0 Mapper

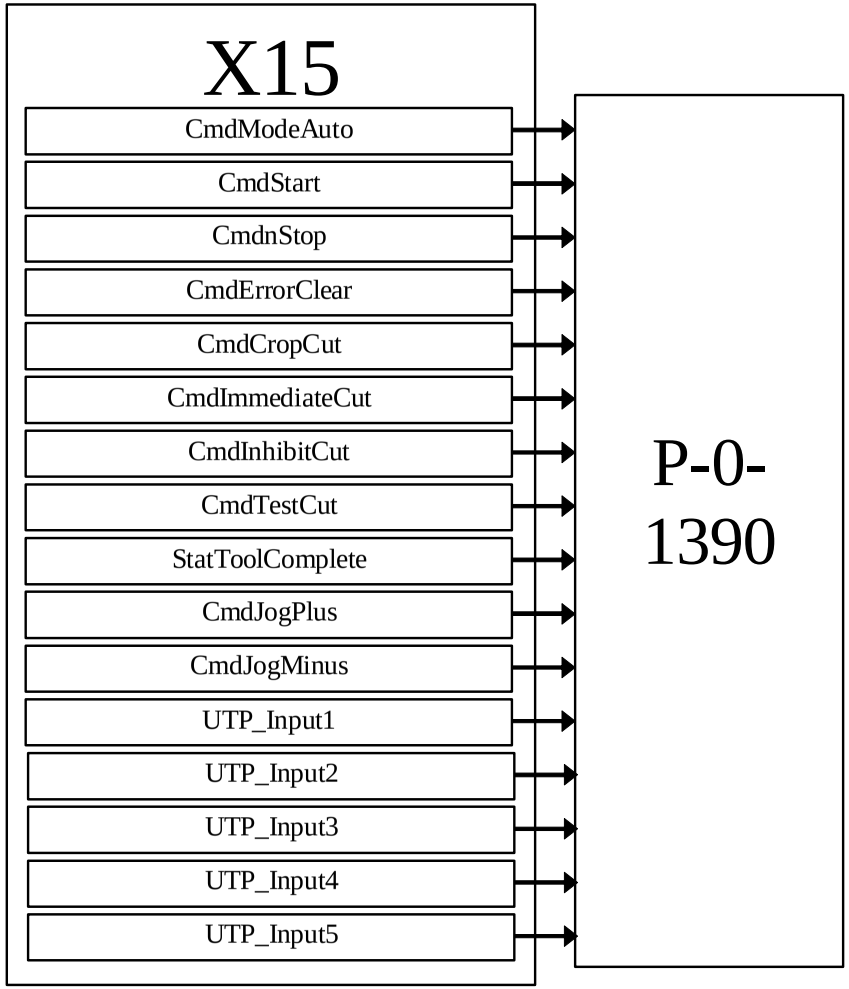
- Maps Control and Status Signals to defined Parallel or ProfiBus addresses
- User configurable to fit various application needs (Default Template program)
- Definable Signal source for Level Sensitive Inputs (VCP, Parallel, Profibus)
- Inputs mapped to P-0-1390
- Outputs mapped to P-0-1410

- Automatic Parameter Configuration (written on start-up)
  - Parallel Digital I/O (if CSH01.2C-PL-***)
    - MLD CONNECTOR X15 mapped to P-0-1390 / P-0-1410
    - Writes (S_0_0026 / S_0_0328 / S_0_0027 / S_0_0329)

  - Profibus (if CSH01.2C-PB-***)
    - Real-time data words ProfiBus configuration (P-0-1390 / P-0-1410)
    - Writes (P_0_4080 / P_0_4084)

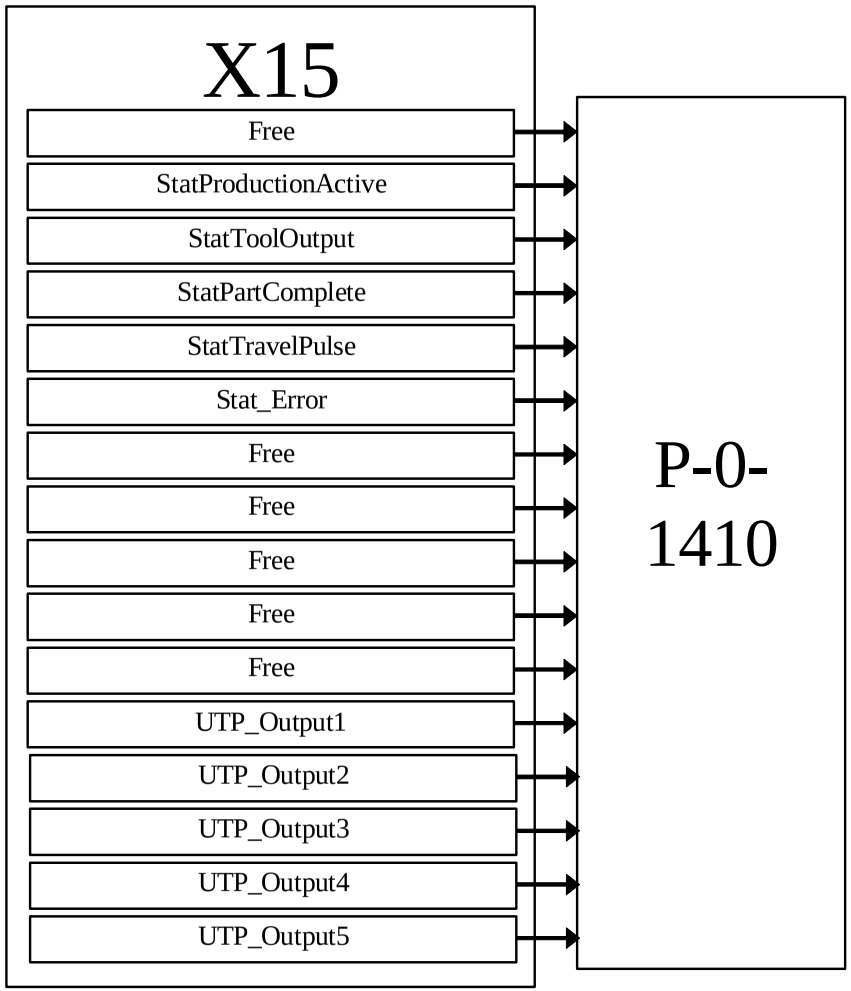
Basic Operation (6) System I/0 Mapper

- Inputs mapped to P-0-1390



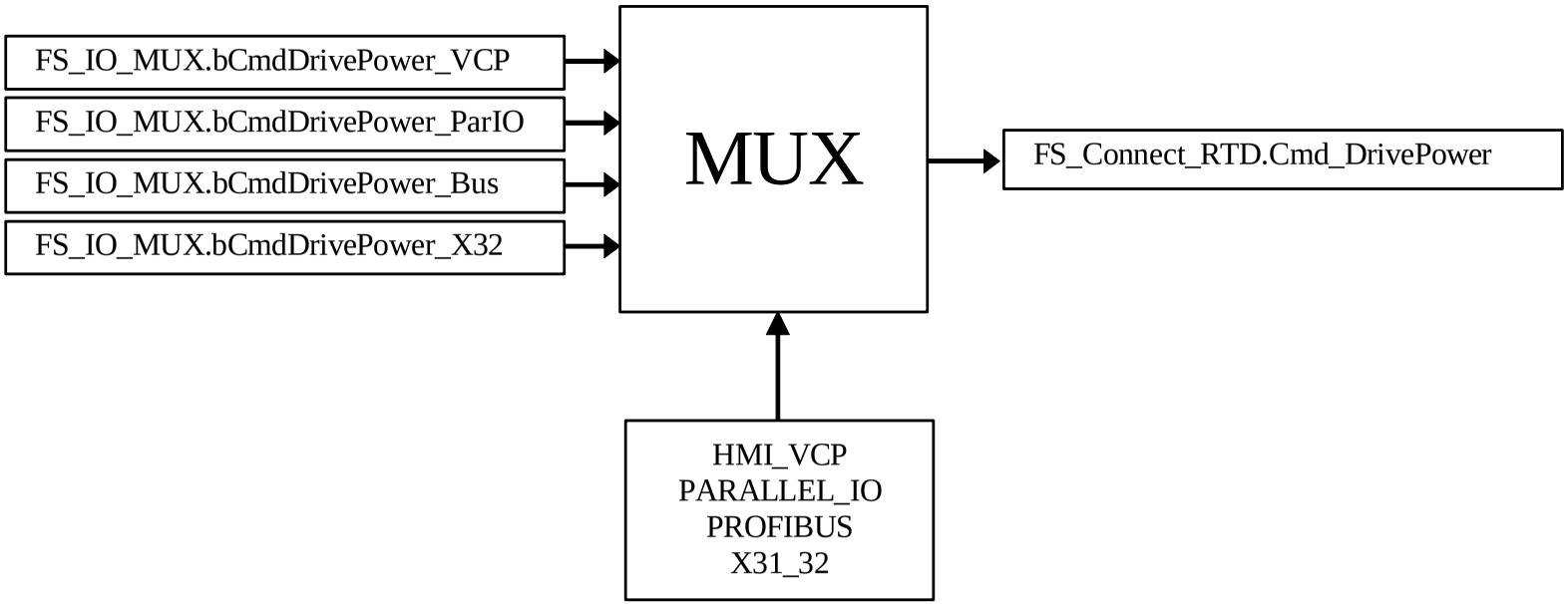
Basic Operation (6) System I/0 Mapper

- Outputs mapped to P-0-1410



Basic Operation (6) System I/0 Mapper

- Mux selects signal source for Level Sensitive Inputs (Enumeration names):



Conclusion and Discussion

- Flying Shear Version 4 provides a basic Turn-key system solution
- Future enhancement not contained in this Library can be specified for Ver 8
  - Enhance Registration – Cut after mark count
  - Enhance Homing – better support for Abs feedback
    - ?
- Requests for Digital I/O or Bus based interfaces? (SERCOS-3, Ethernet IP)
- Optional HMI solutions for commissioning (VEP/WinStudio)
- Optional third party HMI support (OPC)
- Support for (CLM) Interpreter language for custom User Tool Programs (No IndraLogic required)
- User friendly commissioning of Drive, Flying Shear without IndraWorks? (VCP, VEP, ProfiBus, etc…)
- Provide as a standalone FB for integration into customer project