HELMSMAN

FACTORY AUTOMATION

DATASHEET

Early release

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The soft PLC you program by describing the machine. The agent writes standard IEC 61131-3 Structured Text from your spec, you check it on a live diagram, and an engineer approves it before it runs.

1. DESCRIBE

State the sequence, the interlocks and the alarms the way you would to a colleague. Attach the drawings.

2. VALIDATE

See the draft as a live diagram and run it against a simulation of your I/O. Tap any output to see what drives it.

3. APPROVE

An engineer signs off with a PIN. The change goes live between scans; every version is kept and can be rolled back.

SPECIFICATIONS

LANGUAGE	IEC 61131-3 Structured Text · PROGRAM, FUNCTION, FUNCTION_BLOCK · plain `.st` files
DATA TYPES	BOOL · SINT, INT, DINT, LINT and unsigned · BYTE, WORD, DWORD, LWORD · REAL, LREAL · TIME · arrays, structs, enumerations
STANDARD BLOCKS	TON, TOF, TP · CTU, CTD, CTUD · R_TRIG, F_TRIG · SR, RS · BLINK_PATTERN · numeric, selection, comparison and conversion functions
IMPORTS	PLCopen TC6 XML v2.01 (LD, FBD, ST) · Logix L5X, ladder subset: XIC, XIO, OTE, OTL, OTU, ONS, TON, TOF, RTO, CTU, CTD, RES, compares, math, MOV, CLR, COP, JSR
SCAN	Fixed period per program · 1 to 10 000 ms · default 10 ms · hot swap between scans
WATCHDOG	1 000 000 instructions per scan · a fault stops that program with outputs zeroed; the others keep running
ETHERNET/IP SCANNER	CIP Class 1 exclusive owner and input only · Forward_Open, Large_Forward_Open, Forward_Close · RPI from the device's EDS · ListIdentity, Get_Attribute_Single, Get_Attributes_All, Multiple Service Packet · TCP/UDP 44818, UDP 2222
ETHERNET/IP ADAPTER	Identity object · input and output assemblies · Forward_Open · cyclic Class 1 I/O · verified against the OpENer reference stack on every change
LOGIX TAGS	Read Tag (0x4C), Read Tag Fragmented (0x52), symbol browse, backplane routing · CompactLogix, ControlLogix · read only: no write service in the controller build
MODBUS	TCP master, port 502 · RTU over a serial port · FC 01, 02, 03, 04, 05, 06, 16 · named I/O map, bit and register points, scaling
CONTROLLER I/O	Digital inputs and outputs on the header · WebAssembly drivers, sandboxed to their own device's socket
OPC UA	Server · opc.tcp, port 4840 · SecurityPolicy None, anonymous · loopback by default, LAN by choice
WEBHOOKS, TRENDS	HTTP and HTTPS POST, JSON, on events · trends on the controller: 10 min window, 2 400 points per signal · snapshots with rollback
API AND UI	HTTP + JSON API, port 8080 · HTTPS, TLS 1.2 and 1.3, certificate made at first boot · browser editor served by the controller (WebAssembly) · MCP for agents
ACCESS	Roles operator, engineer, integrator · PIN · approval policy per controller · audit log of every deploy, force and release · forces end at sign-out
AGENT	Programs from a description · proposals reviewed before deploy · drop-ins: P&ID, electrical drawing, panel photo (PNG, JPEG, WebP), PDF · explain mode · reaches the controller only through its API and policy
PLATFORM	64-bit Linux, arm64 and x86-64 · one compiled service, headless · no database server, no cloud, nothing on the workstation
ASSURANCE	1 300+ automated tests · interoperability suite against OpENer in CI · memory-safe implementation · Apache 2.0

WHY IT HOLDS UP

ROBUST

A minimal set of dependencies. Every change passes more than 1,300 automated tests and interoperability tests before it ships.

SIMPLE

One controller, one service, its own web screen. No cloud, no database server, no stack of microservices.

SAFE

Written in a memory-safe language. Changes need an engineer's approval, every change is audited, and the safeguards stay out of your way.

RELIABLE

Compiled, native performance on a fixed scan. A watchdog bounds every scan, and a faulted program stops alone with its outputs safe.

WHAT HAS BEEN TESTED

OpENer reference adapter	**verified**
Helmsman's own adapter, same suite	**verified**
Moxa ioLogik E1213, Modbus TCP and EtherNet/IP	**bench pending**
Rockwell CompactLogix, read without writing	**bench pending**

Each verified row is a passing test or a capture; the suite runs on every change against an open-source EtherNet/IP device in a container. Ethernet protocols today; others as customers need them.

WHAT THE AGENT WRITES

```
PROGRAM line
VAR
  s1, s2 : station;
  jam_1 AT %IX0.0 : BOOL;
  alarm AT %QX0.2 : BOOL;
END_VAR
s1(enable := TRUE, jam := jam_1);
s2(enable := TRUE, jam := FALSE);
alarm := s1.alarm OR s2.alarm;
END_PROGRAM
```

Try it with nothing to install: helmsman.advin.io/playground runs a controller in the browser against simulated I/O, with the same editor and diagram.