

# Mechatronics Technician

## Exam Preparation Documentation

### Part 2 Phase 1

### 2026

Test Taker first and last name:

Test Taker number:

Test Taker company:



German American  
Chambers of Commerce  
Deutsch-Amerikanische  
Handelskammern

**German American Chamber of Commerce  
of the Midwest, Inc.**

150 North Michigan Avenue, 35<sup>th</sup> Floor  
Chicago, Illinois 60601

Phone: +1 (312) 644-2662 | Fax: +1 (312) 644-0738  
[www.gaccmidwest.org](http://www.gaccmidwest.org)

## General Note

In the final examination, part 2 the test taker must carry out the written and practical assignments as described on the next page.

The test equipment listed in this booklet must be provided by the training organization for the final examination work task/assignment.

Materials necessary for the final examination and this preparation booklet must be provided to the test taker prior to the final examination day so that the test taker can test the completeness and functionality of the examination material.

The mechatronics system described in this booklet must be designed and tested according to applicable rules and regulations.

The company's own tools and equipment may be used.

By his/her signature on the day of the examination, the test taker confirms that he/she has received safety training and will follow instructions.

### **IMPORTANT Examination preparation information:**

This booklet contains the technical documentation required to complete the preparation assignment. The documentation has been designed to be as neutral as possible and must, if necessary, be adapted to suit the operational components. **Note the highlighted items in the documentation. Be sure that the material you have meets these requirements or quantities as listed.**

On the first page of this booklet, be sure to enter your first and last name.

The standard provisioning documents and preparation material can be accessed and downloaded from the **ICATT or MAT2 apprentice resource pages**

Preparation consists of 2 parts/booklets – a Phase 1 (distributed mid-March) and a Phase 2 (distributed mid-April)

1. You will receive these preparation booklets with schematics, diagrams, and blueprints approximately 3 months before exam day
2. PHASE 1: All parts are to be procured, tested, assembled, programmed and prefabricated according to the Phase 1 preparation booklet as is. No modifications should be added. PLC program operands should be added for the identified inputs and outputs. Keep all notes to present in an organized folder.
3. PHASE 2: After completion of the PHASE 1 Yellow preparation booklet, **you will complete numbers/steps 1-6 as listed in the Phase 2 to modify your assembly from Phase 1. Only steps 1-6 as outlined on page 3 of your Phase 2 Yellow preparation booklet should be added to your current set up from Phase 1 Yellow preparation documents. Follow directions as given in 1-6. At this time, per step 7 instructions you should also modify or draw in changes to the Phase 1 diagrams, schematics, and blueprints according to steps 1-6. Keep updated and complete documentation in a binder to hand in to the exam board when you arrive at the exams.**

This Phase 1 booklet as well as any other material used in preparation of the practical assignment must be collected and brought to the examination on examination day and presented in an organized manner for evaluation by the exam board. All notes and documentation will be reviewed before the exam and the exam board reserves the right to remove items that conflict with examination preparation expectations prior to start of the examination. Please do not include photos in your folder.

## Final Examination Part 2, examination scope

## Work assignment outline – Model for Complete Action

Outline of action steps apprentices are expected to perform when starting any work project or system modification and therefore are also expected to perform both when preparing for the examination and during the examination.

1. Inform:
  - Analyze work assignments
  - Prepare information from the documents provided
  - Explain technical and organisational interfaces
  - Evaluate and select optional solutions based on technical, economic, and ecological considerations
2. Plan:
  - Plan and cross-check assignment procedures
  - Specify steps of assignment
  - Compile planning documentation
  - Take into consideration the work procedures and conditions at location
3. Make Decisions/Procure:
  - Resources, equipment, aids, test equipment, raw materials
  - Semi-finished products
  - Tools etc, to be selected, secured and prepared
  - Arrange for space and time
4. Implement:
  - Perform assignments
  - Check and document operation and safety
  - Follow standards and specifications for the system quality and safety
  - Systematically identify causes of errors and defects
5. Check:
  - Select and use test methods and equipment
  - Determine suitability of test equipment
  - Check and document results
  - Systematically identify, rectify and document quality defects
6. Assess/Handover:
  - Approve and hand over systems
  - Provide customer instructions
  - Prepare acceptance protocol
  - Document and evaluate results and performance
  - Record/save system data and documentation

On Exam Day, the test taker should in 6 hours prepare, perform, follow up and document the practical assignment using the documentation that is provided on the day of the exam. On exam day the exam board will observe the test taker's work and conduct an on-site technical discussion of a maximum of 20 minutes during the work assignment. The work assignment will be evaluated through observation of the test taker's process, documentation, and technical discussion.

Final Examination Overview - ICATT Mechatronics Technician			
Final examination: Part 1 Weighting: 40 %		Final examination: Part 2 Weighting: 60 %	
Areas of examination		Areas of examination	
<p><b>Practical task with professional, situation-based discussions</b></p> <p>Weighting: 50 % Total time permitted: 6.5 h</p>	<p><b>Written examination</b></p> <p>Weighting: 50 % Total time permitted: 1 h 30 min</p>	<p><b>Practical task with professional, situation-based discussions</b></p> <p>Weighting: 50 % Total time: 14 h</p>	<p><b>Written examination</b></p> <p>– Work planning – Functional analysis – OSHA and Workers Rights</p> <p>Weighting: 50 % Total time permitted: 4 h 15 min</p>
<p><b>– Planning*</b> Weighting: 20 % Time suggested: 30 min</p> <p><b>– Execution including tech discussion</b> Weighting: 40 % Time suggested: 4 h</p> <p><b>–Commissioning</b> Weighting: 35 % Time suggested: 2 h</p>	<p><b>– Part A (50%):</b> 23 multiple choice questions 3 of which can be deselected</p> <p><b>– Part B (50%):</b> 8 short answer questions No deselection possible</p>	<p><b>– Preparation for the practical task</b> Time allotted: 8 h In company</p> <p><b>– Execution of the practical task</b> Time allotted: 6 h At exam site</p> <p>Including <b>technical discussion</b> Time allotted: 20 min</p>	<p><b>– Work Planning</b> Time permitted: 105 min Weighting: 40 %</p> <p><b>Part A (50%):</b> 28 multiple choice questions – 3 of which can be deselected</p> <p><b>Part B (50%):</b> 8 short answer questions No deselection possible</p>
<p><b>Professional, situation-based discussions</b></p> <p>Weighting: 5 % Time permitted: 10 min</p> <ul style="list-style-type: none"> <li>– The duration of the discussions is included in the examination time.</li> <li>– The discussions can last up to 10 min within the scope of the examination and can be held continuously or in stages.</li> </ul>		<p>Phases:</p> <ul style="list-style-type: none"> <li>– Information</li> <li>– Planning</li> <li>– Execution</li> <li>– Review</li> </ul> <p>The practical task is assessed by means of:</p> <ul style="list-style-type: none"> <li>– Task-specific documents</li> <li>– Professional, situation-based discussions</li> <li>– Observations by the board of examiners</li> </ul>	<p><b>– Functional analysis</b> Time permitted: 105 min Weighting: 40 %</p> <p><b>Part A (50%):</b> 28 multiple choice questions 3 of which can be deselected</p> <p><b>Part B (50%):</b> 8 short answer questions No deselection possible</p>
<p>*The planning phase takes place after the written assignments. If the planning time is exceeded or not used in full, the relevant deviation is compensated for in the execution and review phases to ensure that the total permitted time of 6 h 30 min is not exceeded.</p>			<p><b>– OSHA and Workers Rights</b></p> <p>Time permitted: 45 min Weighting: 20 %</p> <p>20 multiple choice questions 5 of which can be deselected</p> <p>4 short answer questions 1 of which can be deselected</p>

# AHK-USA Chicago

Final Examination Part 2 - 2026

**General Information**

**Mechatronics Technician**

All of the information in this booklet is provided for you to prepare for the practical examination.

Use the documents in this booklet to gather information, plan the execution of the practical assignment, procure the necessary material, execute the work assignment, and check the execution.

The documents in this packet will assist you in set up and preparation.

Staging and preparation documents for setting up a mechatronics system in preparation for the exam:

- Standard material staging list for the training company (identical to Part 1 final examination)
- List of tools, materials, and test equipment (identical to Part 1 final examination)
- Information on the axis module require (sketches, drawing for the prefabrication of individual parts, etc.)
- Wiring diagram
- Electrical pneumatic diagram
- General information about the work assignment and procedure to follow
- Preparation description and assignment description (functioning level for exam start)
- Work schedule to complete
- Inputs/Outputs for PLC

The mechatronic subsystem to be completed on the day of the exam is to be prepared according to the specifications of this booklet, commissioned, and put into operation in compliance with the valid safety regulations.

The required control cabinet with the control unit is to be prewired according to the documents in this booklet and connected to the mechanical subassembly via the plug connector.

**208V – Connection to the main is made by a 208VAC cable with NEMA L21-20P plug 3-poles +N+PE (5 wires)**

**6mm outer diameter (OD) pneumatic push to connect hose fitting for the pressure regulator**

**This booklet lists additional testing equipment that is required for both the test preparation and the in-person testing. Bring everything listed to the examination even if it was not used during the preparation (unused material may be required to complete the in-person examination). Be sure that all equipment is functioning properly.**

<b>AHK-USA Chicago</b> Final Examination Part 2 – 2026	
<b>Standard Material Staging List for all Mechatronics examinations</b>	<b>Mechatronics Technician</b>

### General information

The components must comply with the accident prevention regulations. The required mounting materials must be provided for the components. Only where required must the connection diagrams and data sheets be supplied for the control components. Sections **I-VI on pages 5-7** include a list of standard materials for both the Part 1 and Part 2 examinations. All items should be made available to the apprentice and brought to the testing facility. Additional items needed for the Part 2 exam have minor changes each year and are listed under section **VII** on page 8.

Before the test, check the components function properly.

- I Parts and equipment that must be brought to the exam by each test taker:**
1. **1** Mounting plate: groove profile plate approx. 700mm x 560mm, alternatively with perforated grid or similar
- II Parts and equipment that must be brought to the exam by each test taker:**
1. **2** Double-acting cylinder, piston diameter: 10mm, stroke: 40mm, threaded piston rod and lock nut, optionally with adjustable end-position damping on both ends, with magnetic ring, mounted on mounting base, with swivel head/fork head. (if additional cylinders sizes are needed for Part 2 they are in section 1 on page 8).
  2. **1** double-acting cylinder, piston diameter: 10 mm, stroke: 25 mm, threaded piston rod and lock nut, optionally available with adjustable end-position damping on both ends, with magnetic ring, mounted on a base and with a swivel head/ fork head. (if additional cylinders sizes are needed for Part 2 they are in section 1 on page 8).
  3. **1** Valve terminal, compatible with Item No.4
  4. **3** 5/3-way valve (with manual overrides). Electrically actuated on both sides, with free-wheeling diode, with magnetic clutch sockets (24V DC), with part blocking setting and 1 meter long, preassembled connection line, nominal width: 4 to 5mm, incl. plug connection compatible with page 6 III/5
  5. **1** 3/2-way valve, with spring return, with neutral position locking, single-side electric control with manual override, lockable, incl. plug connection compatible with page 6 III/5
  6. **1** Pressure switch, up to 6 bar, 24V DC, 1 two-way contact or 1 NO-1NC (electronic 3-wire pressure sensor also possible), incl. plug connection compatible with page 6 III/5
  7. **1** Adjustable pressure regulator valve with constant output pressure, can be regulated from 1 bar, (with increase reverse ventilation with the integrated check valve) with pressure gauge.
  8. **6** One-way restrictor (exhaust throttle), can be adjusted and secured, with fastening on the cylinder or on the mounting plate, compatible with I/1
  9. **X** Sound absorber (silencer)
  10. **6** Proximity switch, operating voltage: 24V DC, actuated by magnetic ring, compatible with Item No. 1 and 2 with connected cable, 1 NO, 3-line connection incl. plug connection compatible with page 6 III/5
  11. **0.7m** wiring duct, slotted, at least approx. 80 x 80mm with snap on cover
  12. **10** Dummy plug with snap on cover for item no 13
  13. <sup>1)</sup>**X** Push-in fitting, straight, outlet for plastic tube, push-in connection
  14. <sup>1)</sup>**3** Push-in T-fitting, suitable for plastic tube

<sup>1)</sup> = **compatible with plastic tube** inner diameter 2 mm, outer diameter 4 mm or inner diameter 4 mm, outer diameter 6 mm

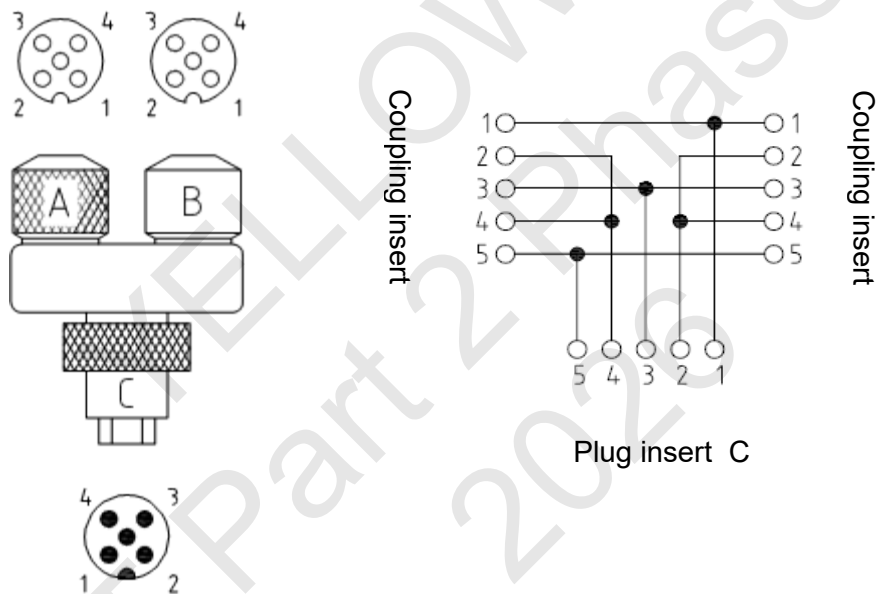
**X = depends on number of components in use**

#### NOTE:

- **The connection points for the valves must be clearly identified (letters or numbers)**
- **The pneumatic and electro-pneumatic components must be provided equipped with push-in fittings on the pressure ports and silencers on the exhaust ports.**
- **Appropriate fasteners must be provided for the components (screws, nuts...)**

**III Parts and equipment that must be brought to the exam by each test taker:**

1. 1 Signal column lights 24 V DC (3 lights, red, green, white), incl. plug connection compatible with Item No. 5
2. 1 Capacitive proximity sensor, 3 line connection, 1 NO, PNP-output, operating voltage: 24V DC, metal housing with thread M12 x 1, usable thread length at least 30mm, with 2 securing nuts, flush mountable, operating distance: 4mm, with approx. 1.5m long preassembled connection line, incl. plugconnection compatible with Item No. 5
3. 1 Inductive proximity sensor, 3 line connection, 1 NO, PNP-output, operating voltage: 24V DC, metal housing with thread M12 x 1, usable thread length at least 30mm, with 2 securing nuts, flush mountable, rated operating distance: 4mm, with approx. 1.5m long preassembled connection line, incl. plug connection compatible with Item No. 5
4. 1 Evaluation unit for the fiber optics/fiber optic sensor, distance at least 0-50mm, operating voltage: 24V DC, PNP output, switching status display, connection line incl. Plug connection compatible with Item No. 5 (incl. Fiber optics, one-way-function, straight M4, length approx. 50cm)
5. 2 Actuator/sensor distribution system with M12 (or customary) I/O slots 4-pin + PE with master cable, 8 fold, 2 signals per socket
6. 10 T-distributor with two M12-couplings (or customary) compatible with Item No. 5

**Possible connection of T-connector with partial drawing****IV Parts and equipment that must be brought to the exam by each test taker:**

15. PLC-system programmable with at least the following performance characteristics
  - Voltage/power supply 24VDC/4 A (also see page 6 I/2)
  - 24 inputs
  - 24 outputs
  - Storage medium for uploading an alternative control program

**NOTE: The PLC can be installed in the control cabinet (internal) or externally, for example with additional plug connections.**

**V Additional parts and equipment that must be brought to the exam by each test taker:**

**ITEMS highlighted in yellow in section V are specific to the US:**

1. 1 Control cabinet with (W x H x D) 600m x 800mm x at least 250mm, (size recommended) if necessary, secured from tipping with an additional supporting construction
2. 1 24 V power supply unit DC, 4 A, or alternative power supply appropriate for the PLC
3. 1 Mounting rail according to DIN EN 50022 (DIN rail), compatible with Item No. 6, length approx. 2m

4. **6** End bracket, compatible with Item No. 6
5. **6** End plate, compatible with Item No. 6 (for example 4 x grey, 2 x blue)
6. **90** Terminal block 2.5 mm<sup>2</sup>, compatible with Item No. 3 (for example, grey)
7. **5** Terminal block 2.5mm<sup>2</sup>, compatible with Item No. 3, blue
8. **6** PE terminal block 2.5mm<sup>2</sup>, compatible with Item No. 3
9. **3** PE terminal block 6.0mm<sup>2</sup>, compatible with Item No. 3
10. **X** Identification label/plate, compatible with Item No. 6
11. **X** Connecting bridge, compatible with Item No. 6
12. **1** EMERGENCY OFF switching device (safety relay), 24V DC, dual-channel operation with grounding, short circuit, and crosswire short detection in the input circuit, monitored start, feedback circuit to monitor external contractors (at least 2 x NO)
13. **1** Load break switch, 3-pin approx. 25 A for installation (extension) IP 40
14. **3** Contactor with suppressor 4kW, 24V DC; 3 H + 2 NC, 2 NO (-QA2 & -QA3) additional contactors may be needed for the Part 2 exam, see section I/14 on page 8)
15. **1** Motor protection switch/motor starter 3 x 0.25 to 0.40A Eaton # XTPRP40BC1, (with auxiliary contact, 1 NC, 1 NO) for 200V 3 phase motor used – if 400V 3 phase motor is used the appropriate motor protection switch must also be used
16. **1** Circuit breaker B 10 A, 1-pole
17. **1** Circuit breaker B 6 A, 1-pole
18. **1** Circuit breaker C 4 A, 1-pole
19. **1** Fault-current circuit breaker (RCD), 16 A/10mA, 2-pin, type A
20. **1** NEMA L21-20 flanged inlet three-phase plug, 5-pin, -X0
21. **1** NEMA 5-15R socket for DIN rail mounting, 125 V, 15 A, -X11
22. **2** Extension housing for 40-pin socket insert
23. **2** Socket insert, 40-pin (\*crimp, screw or screwless insert) \*observe the necessary cross section for the crimp contacts
24. **2** Sleeve housing for 40-pin male insert + PE, 1x with multiple screw connections adapted to the actuator sensor distribution system, compatible with page 6 III/5
25. **2** Pin insert, 40-pin (\*crimp, screw or screwless insert) \*observe the necessary cross section for the crimp contacts
26. **1** NEMA L21-20R three-phase receptacle, 5-pin, -X13
27. **4m** Wiring duct, slotted, at least approx. 45 x 65mm
28. **95m** Plastic cable H05V-K 0.5mm<sup>2</sup>, dark blue or customary (24 V control circuit)
29. **3.5m** Plastic cable H07V-K 1.5mm<sup>2</sup>, light blue or customary (neutral conductor)
30. **3m** Plastic cable H07V-K 1.5mm<sup>2</sup>, red or customary (230 V)
31. **5m** Plastic cable H07V-K 1.5mm<sup>2</sup>, red or customary (protective conductor)
32. **12m** Plastic cable H07V-K 1.5mm<sup>2</sup>, purple or customary (emergency off switching device)
33. **12m** Plastic cable H07V-K 2.5mm<sup>2</sup>, black or customary (main power circuit)
34. **2m** Plastic cable H07V-K 2.5mm<sup>2</sup>, orange or customary (feed in for load break switch)
35. **5m** Plastic cable H07V-K 6mm<sup>2</sup>, green/yellow or customary (protective conductor)
36. **X** Insulated end sleeve (ferrules)
37. **X** Insulated ring cable terminal
38. **Approx. 50 cable ties**, approx. 100mm long
39. **X** Self-adhesive labels to label the components

**X= based on the number of components used**

**NOTE: The Home structure of the control cabinet follows the layout diagram on Sheet 1 of 1 included at the start of the schematic diagrams. Any components that are not mounted are to be brought with to the examination.**

#### **VI Control unit parts and equipment that are to be brought to the exam by each test taker:**

1. **1** External display and control unit as a housing unit with 18 installation holes
2. **1** Built-in EMERGENCY STOP button insert, 2 channel, 2 NC, locking, fitting to Item no 1
3. **2** Built-in switch insert (toggle stitch, locking), 1 NO, 0-1 (off and on), fitting to Item No. 1
4. **1** Built-in illuminated push button insert with light fixture, 1 NO, red, 24V, fitting to Item No. 1
5. **7** Built-in illuminated push button insert with light fixture, 1 NO, white, 24 V, fitting to Item No. 1
6. **7** Built in indicator lamp with light fixture, 6x white, 1x green, 24V, fitting to Item No.1
7. **10** Dummy plugs for installation unused holes, fitting to Item No. 1
8. **1** Flexible control cable, length approx. 3m, for example, 0.75mm<sup>2</sup>, 40-pin + PE, inserted on the display and control unit with cable strain relief.

More test equipment is listed than is necessary in the initial set up and preparation for the examination. The differing amounts are therefore to be brought along by the test taker in a functioning state on the day of the examination.

**General**

**In addition to the test material listed in the “Standard Material Staging List” the following material is also necessary for the Part 2 examination:** Yellow highlighted items are specific to the US. The highlighted green items are to be given special attention as they are likely an addition from any previous examinations. Check that you have the proper type and minimum quantity of all items.

**The materials should be checked before the test to ensure proper functionality.**

**VII Additional parts that must be brought to the exam by each test taker specifically for this Part 2 exam:**

1. **5m** plastic tube, preferably: inner diameter 2 mm, outer diameter 4 mm; optionally: inner diameter 4 mm, outer diameter 6 mm
2. **1** double-acting cylinder, piston diameter: 10 mm, stroke: 60 mm, piston rod with thread and lock nut, optionally available with adjustable end position damping on both ends, with magnetic ring, mounted on a base and with a swivel head/ fork head.
3. **2** throttle check valve (exhaust throttling), adjustable and securable, fastened to cylinder or mounting plate, compatible with item no 2
4. **2** proximity switch, operating voltage: 24 V DC, actuated via magnetic ring, compatible with item no 2 with connection cable connected. 1 NO. 3-wire connection. incl. push-in fitting compatible with page 6 III/5
5. **1** Axis model made according to the drawing provided in accordance with additional details
6. **3** Contactor with suppressor 4 kW, 24 V DC; 3H + 2 NC, 2 NO (-QA5, -QA6, and -QA61)
7. **1** Gear motor with releasable coupling, adapted to the spindle drive of the axis model: three-phase 208V, 25W, 60Hz, .24A approx. with connecting material (400V is also possible with the appropriate motor protection switch)
8. **3m** H07RN-F 4G1.5 mm<sup>2</sup>, black or customary, or S00W 12AWG 4-wire, compatible with Item No.8 (-X13 wire)
9. **1** 1 NEMA L21-20P for connection of Item No.7 (-X13 plug)
10. **3** inductive proximity sensor, 3-wire connection, 1 NO, PNP output, operating voltage: 24 V DC, metal housing with thread of M12 x 1, minimum usable thread length of 30 mm, with 2 mounting nuts, suitable for flush installation, rated operating distance: 4 mm with approx. 1.5 m longer prefabricated connection cable incl. push-in fitting compatible with page 6 III/5
11. **1** light fixture, 1 x red, 24 V, compatible with page 7 II/6
12. **1** Integrated illuminated button with light source, 1 NO, white, 24V, compatible with page 7 II/1
13. **1** Fasteners for your collection containers, assemblies, and pneumatic components on the mounting plate
14. **1** Fuse socket (-F0) D01, 3 pin with suitable screw caps
15. **3** Adapter sleeve insert D01, 10 A, compatible with item no 14
16. **3** Neozed fuse link D01, 10 A, compatible with item no 14
17. **1** Assembly fabricated and assembled according to the drawings provided in accordance with additional details in the mechanical drawings (see pages 24 of Phase 1 and 55 of Phase 2).
18. **X** semi-finished product without assignment to drawing (see page 25)
19. **1** Fork light barrier (e.g., Panasonic, PM-T45-P, T-type, 5-24 V/DC) with approx. 1.5 m long pre-assembled connection cable including plug connector suitable for page 7, III/5, including matching mounting screws
20. **2** Cap screw M4 x 12 - 8.8 (DIN EN ISO 4762)
21. **2** Washer 4 (ISO 7089)
22. **3m** Plastic cable H07V-K 1.5mm<sup>2</sup>, green/yellow
23. **3m** Plastic cable H07V-K 1.5mm<sup>2</sup>, light blue
24. **3m** Plastic cable H07V-K 1.5mm<sup>2</sup>, black
25. **30** Insulated end sleeves (ferrules) depending on the type of cable terminal used
26. **1** Reflective light barrier with reflector and standard mountings for test setup, operating voltage: 12-24 V DC Range: min. 50 cm, Output signal: PNP Open Collector (24 V DC and switchable (1 signal when light is ON or light is OFF)), infinitely variable sensitivity adjustment, with approx. 1.5 m long (professionally extended) pre-assembled connection cable including connector M12 (or standard, pin assignment 3 and 4) compatible with page 7, III/5
27. **1** 1 permanent electromagnet, diameter 20 mm, height 25 mm, thread 4 mm, operating voltage 24 V DC, holding force min. 45 N, currentless magnetic (e.g. Red Magnetics ITS-PE-2026)- with approx. 1.5m long prefabricated connection cable (correctly extended), incl. plug connector M12 compatible with actuator sensor distribution system components page 6 III/5

# AHK-USA Chicago

Final Examination Part 2 – 2026

## Practical Task

Training tools, extras and  
Exam Day Equipment

## Mechatronics Technician

The following items are standard equipment that is required for the companies to properly train and prepare an apprentice for the examination. The following equipment must be accessible to each apprentice at his/her training facility and should therefore also be available for use in preparation of the equipment for a mechatronics examination. Not all items will be needed but should be provided whenever deemed necessary according to preparation material and assignment given.

### I Quality measuring equipment that must be provided by the training company for each test taker:

1. 1 caliper	min. 135mm	DIN 862
2. 1 flat square	100x70mm	
3. 1 wide base square	100x70mm	
4. 1 straight edge square	100x70mm	
5. 1 two-pin voltage tester (optional)	according to VDE 0413	

### II Tools that must be provided by the training company for each test taker:

1. 1 scribe		
2. 1 center punch		
3. 1 engineer's hammer	Approx. 300g	DIN 1041
4. 1 mallet		
5. 1 hacksaw for metal	300 mm	DIN 6473
6. 1 flat file	150-1 150-3 250-1	DIN 7261
7. 1 triangular file	150-1 150-3	DIN 7261
8. 1 round file	150-1 150-3	DIN 7261
9. 1 square file	150-1 150-3	DIN 7261
10. 1 semi-round file	150-1 150-3	DIN 7261
11. 1 needle file H3	flat, triangular, round rectangular	
12. 1 file brush		
13. 1 triangular scraper		
14. 1 pin punch	4 5mm	DIN 6450
15. 1 Allen wrench set	SW(WAF) 2.5 3 4 5 mm	ISO 2936
16. 1 screwdriver for slotted screws	A 0.5x3.0 A0.8x4.0 A 1.0x5.5 A1.2x6.5	DIN 5265
17. 1 screwdriver each for Phillip's head screws	size 0 size 1 size 2	DIN 5262
18. 2 parallel C-clamps	40 to 100 mm span or similar	
19. 1 side cutter		
20. 1 combination pliers		
21. 1 angled telephone plier		DIN 5745 B
22. 1 wire stripper		
23. 1 cable tie pliers (if necessary)		
24. 1 crimper for wire-end ferrules	0.14-2.5 mm <sup>2</sup>	
25. 1 cable stripping knife		
26. 1 tubing cutter to shorten pneumatic hoses		
27. Open end wrench of appropriate sizes for mounting of push-in pneumatic fittings and silencers		
28. 1 external snap ring pliers	range approx. 3 to 10mm	DIN 5254

**III Measurement/testing equipment that must be provided by the training company for each test taker:**

1.	1 universal protractor		
2.	1 set of radius gauges	1-7 (concave and convex)	
3.	1 steel rule	300mm	
4.	1 set of feeler gauges	0.05 to 0.5mm	
5.	1 caliper	300mm	DIN 862
6.	1 plug gauge H7	4 5	
7.	1 outside micrometer	0-25mm 25-50mm	
8.	1 VDE-test device VDE 0413	to check protective measures according to VDE 0100-600 (insulation resistance, PE conductor resistance, etc.)	
9.	1 RCD-tester VDE 0413	if not included in Item No. 8	
10.	1 multi-meter with probes		
11.	1 watch/timer with seconds measurement		
12.	1 rotary field test instrument		
13.	1 wire terminal crimper	for wire terminals 1.5mm <sup>2</sup> to 4 mm <sup>2</sup> or crimp contacts	

**IV Tools and equipment that must be provided by the training company for each test taker:**

1.	1 divider/compass	150mm leg length	
2.	1 set of marking stamps (Arabic numbers)	3mm	
3.	Open ended wrench of each size	WAF 6x7 8x9 10x11 12x13 17x19 24x27mm	DIN 3110
4.	1 set of taps (with tap wrench) or machine taps	M3 M4 M5 M6 (standard pitch) M12x1	
5.	1 center drill of each size	Each A 1.6 A2.5	DIN 333
6.	1 twist drill of each size	Each Ø 2.5, 3.3, 3.8, 4.2, 4.5, 4.8, 5.0, 5.5, 5.8, 6.0, 6.6, 8.0, 10.5, 11.0, 12.1, 12.5	
7.	1 counter bore of each size	Each 6.5x3.4 8x4.5 10x5.5	DIN 373
8.	1 tapered countersink 90° of each size	Each 1-5 5-10 10-15	DIN 335
9.	1 machine reamer H7 of each size	4 5	DIN 212
10.	1 appropriate tool to assemble control panel and switches		
11.	1 H7 hand reamer of each size	4 5	
12.	1 Bending aid	r= 4mm; ca. 100 x 40 x 10-40	

**V The following are provided during the examination in the testing center in collaboration with the Exam Board for 1 to 5 test takers:**

- 1 surface plate with general accessories such as height marker, prism, angle, layout fluid
- 1 floor drill press up to 13mm size drill bit with machine vice and general accessories

**VI Test equipment that the company must provide, and each test taker must bring to the examination:**

- 1 chalk
- 1 cleaning cloth
- 1 whisk broom
- 1 file cleaner
- 1 permanent pen/marker for labeling

**VII The following are provided during the examination in the testing center in collaboration with the Exam Board for 1 to 5 test takers:**

- Parallel vice (with protective jaws)
- 1 compressed air connection, with on/off switch, 6 bar and corresponding pneumatic hoses, T-couplings or air manifold, with appropriate air fitting/s (M6 push to connect)
- 1 three-phase socket 3P/N/PE L21-20/208V, 60hz

**VIII Equipment/Resources that the company must provide, and each test taker must bring to the examination:**

1. Mechanical and Metal Trades Handbook and Electrical Engineering Handbook
2. One sided 3x5 note card with a collection of quick reference formulas
3. 1 writing instrument with drawing tools
4. 1 NON-programmable, battery or solar powered calculator without third-party communication possibilities
5. 1 set of personal protection equipment
6. 1 appropriate voltage extension cable to connect the control cabinet at test facility
7. 1 binder/folder for your documents

**IX Programming device that the company must provide, and each test taker must bring to the examination:**

1. Programming device for the PLC system used

YELLOW  
MT Part 2 Phase 1  
2026



# AHK

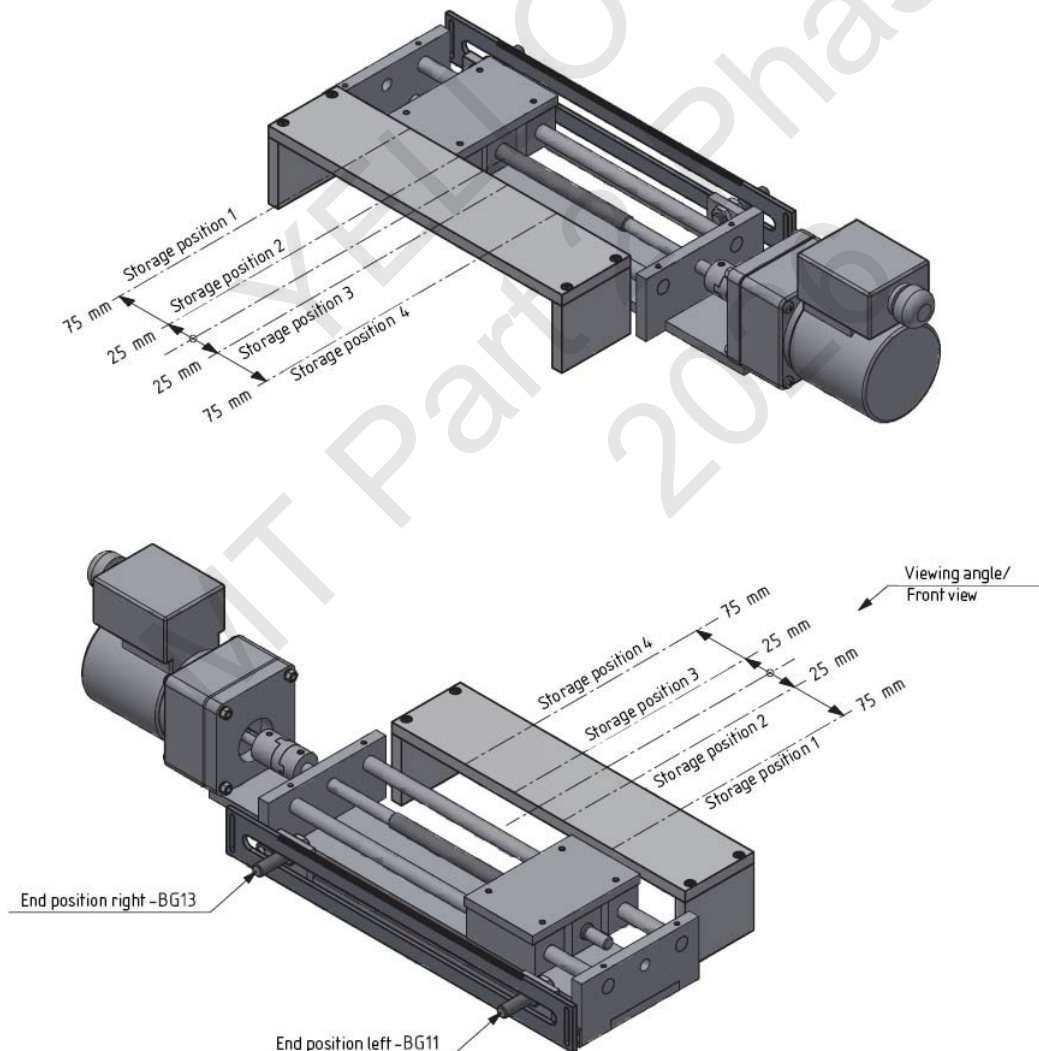
Final Examination Part 2 - 2026

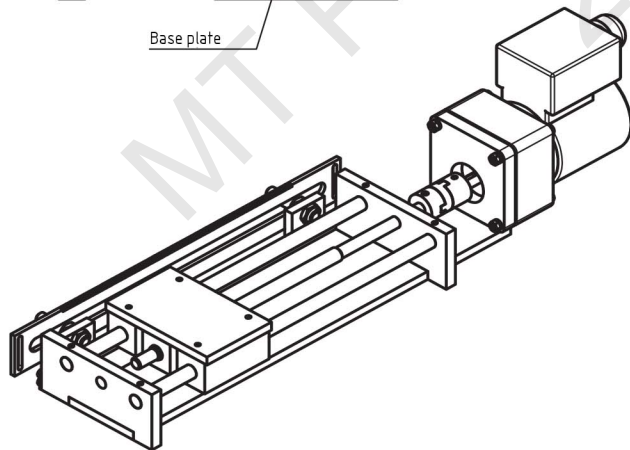
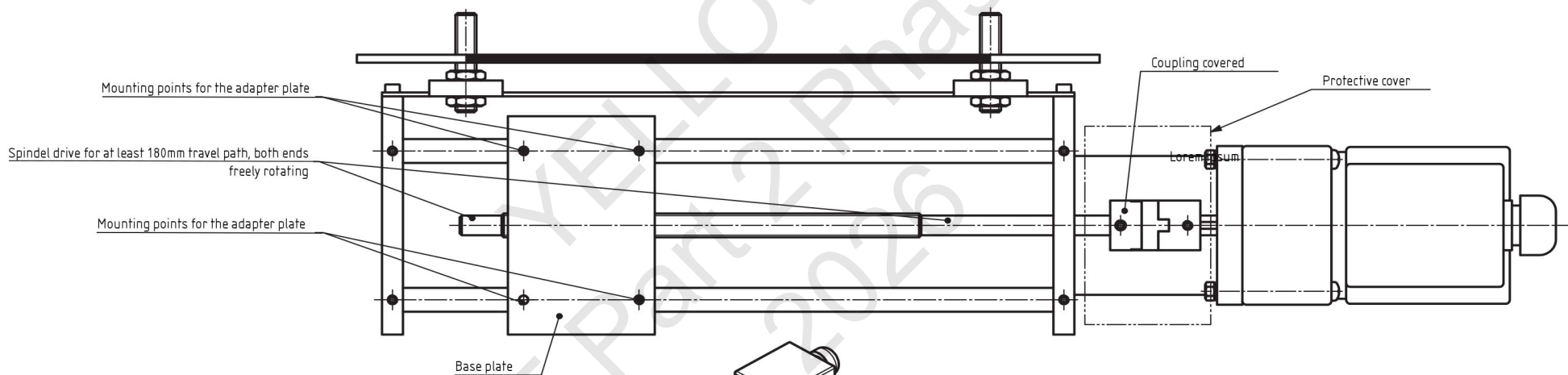
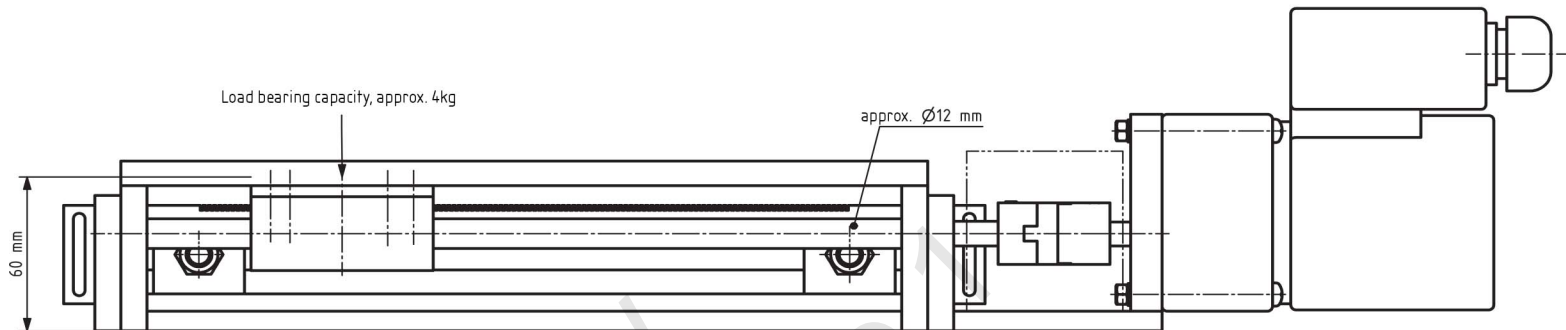
**Preparation of the Practical task:  
Axis Module****Mechatronics Technician**

If not already assembled in kit, you are to procure and fabricate the illustrated axis module (example) according to the following representations and additional information.

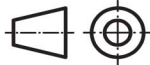
**Please note in particular:**

- Work height of the carriage slide – 60mm
- Capacity of the carriage slide approximately 4kg
- Path of movement at least 180mm
- Free path of carriage slide on both sides at least 30mm
- Coupling covered
- The position of the sensor mount for detecting the carriage slide position must be variable
- Powered by the gear motor
- Fastened to the mounting plate
- Sensors -BG11 and -BG13 register the end positions of the carriage slide 35 mm before a mechanical collision.
- **Home position is: End position left**





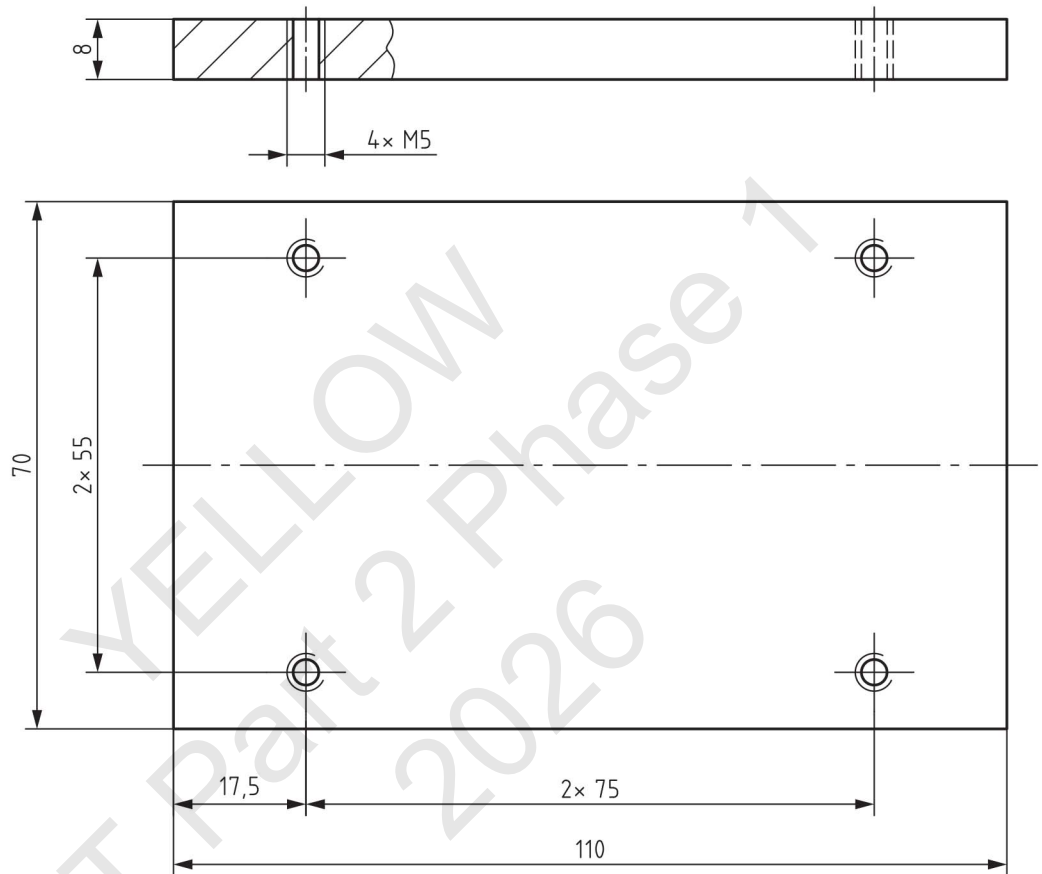
Please note: drawing is not to scale



<b>AHK</b> Final Examination Part 2 - 2026		
Scale	<b>Mechatronics Technician</b>	Sheet: 1(1)
		Test-taker no.
Axis model drawing		

You are to procure and fabricate the shown parts and assemble according to the drawings and additional information on the following pages:

## Base plate

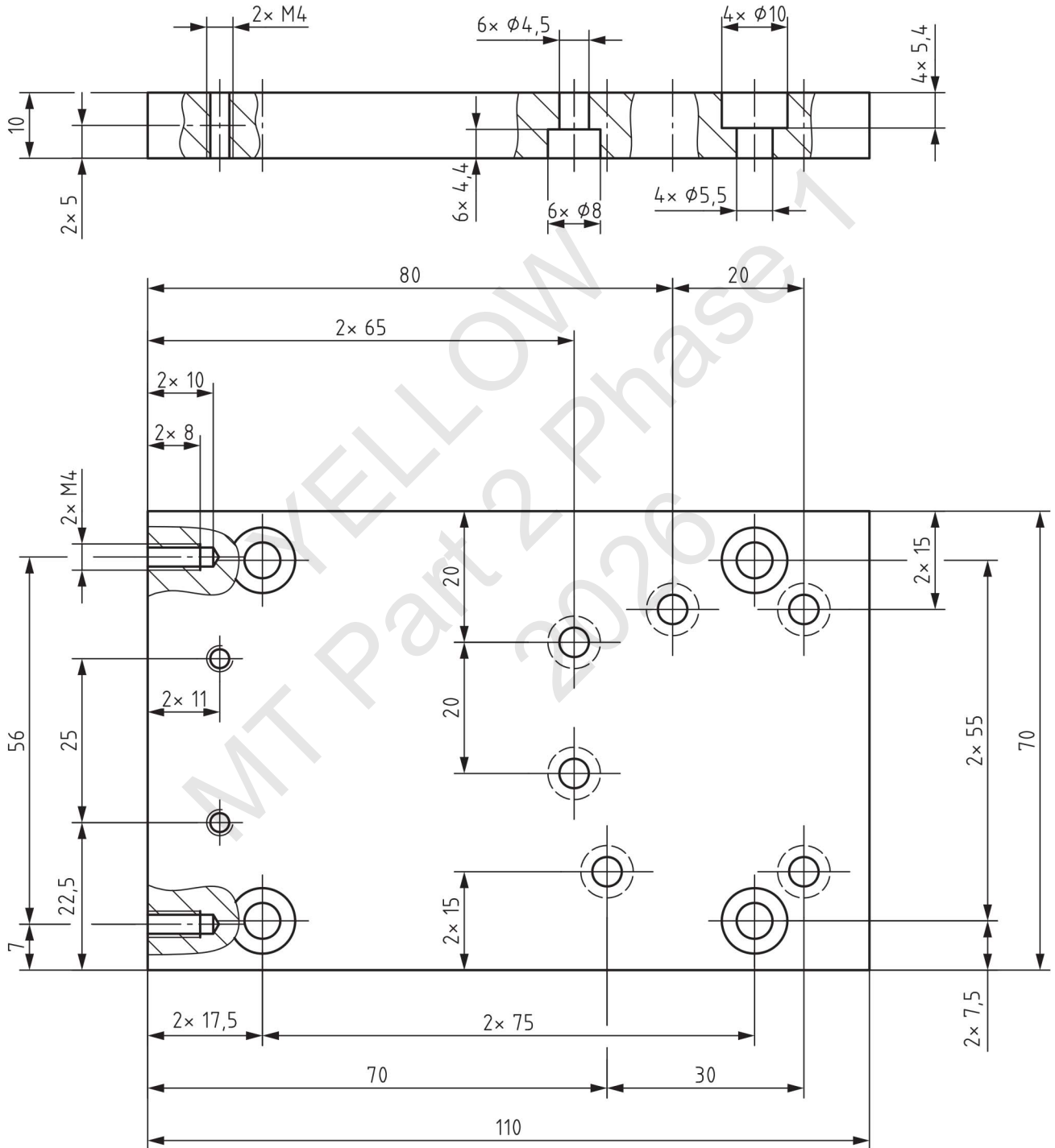


Task  
Semi-finished parts

Mechatronics Technician

## Adapter plate (1)

S235 JR+C  
(fitted to base plate)



# AHK

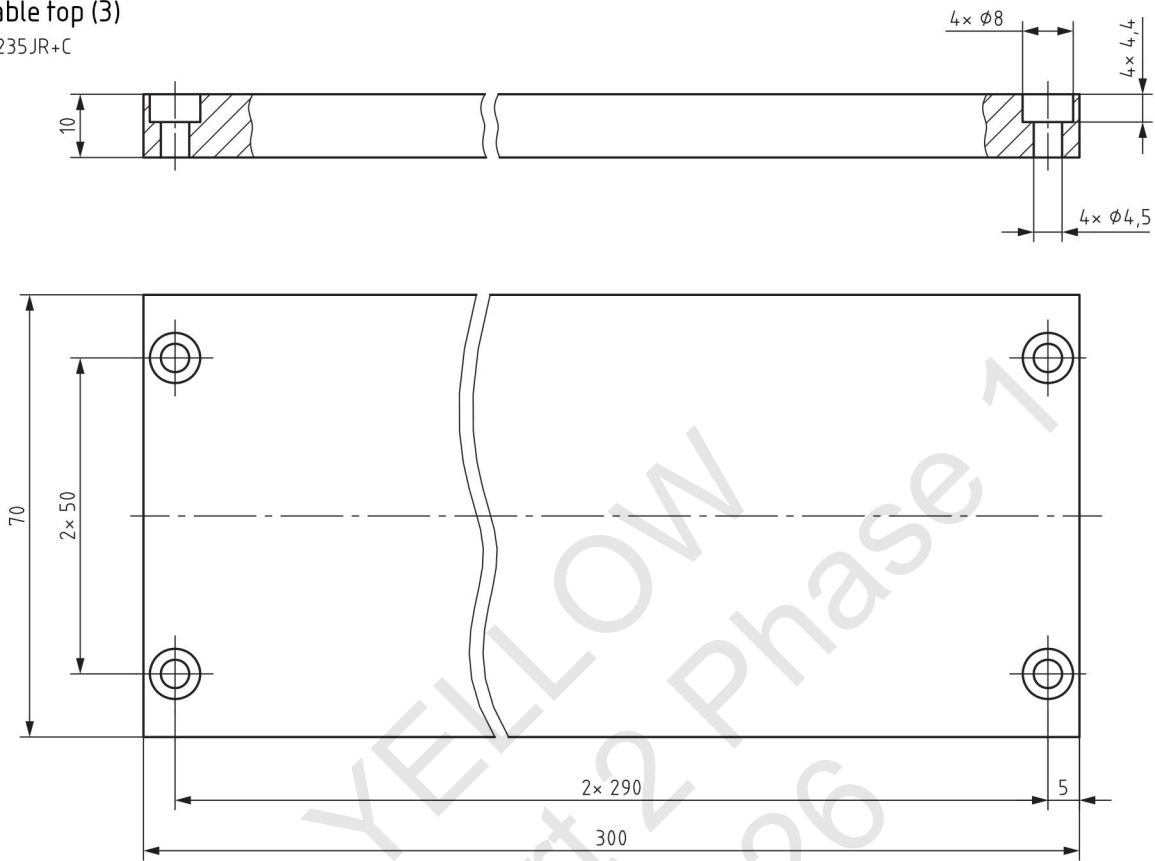
Final Examination Part 2 - 2026

**Task**  
Semi-finished parts

**Mechatronics Technician**

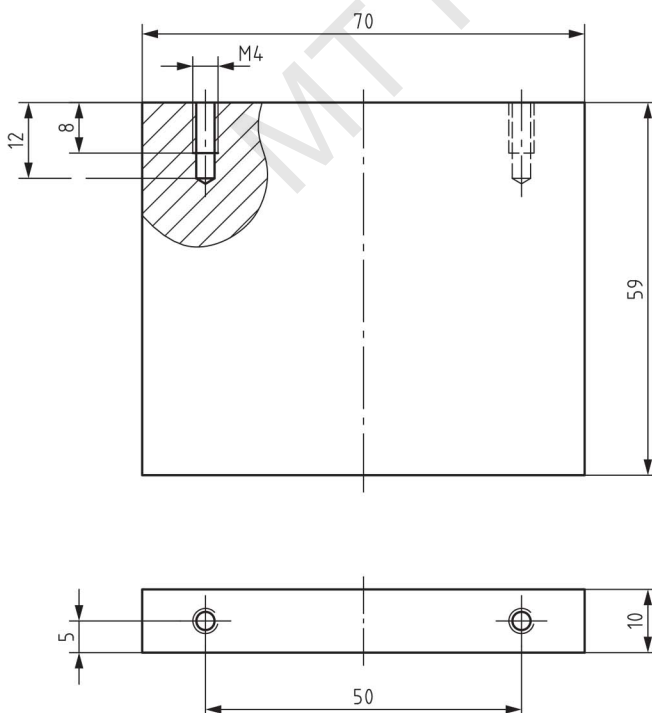
## Table top (3)

S235JR+C



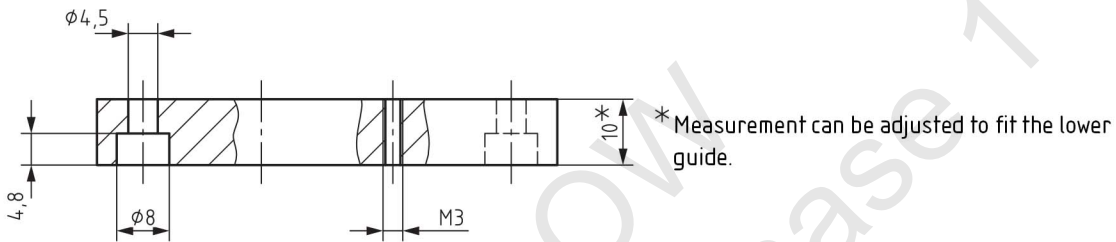
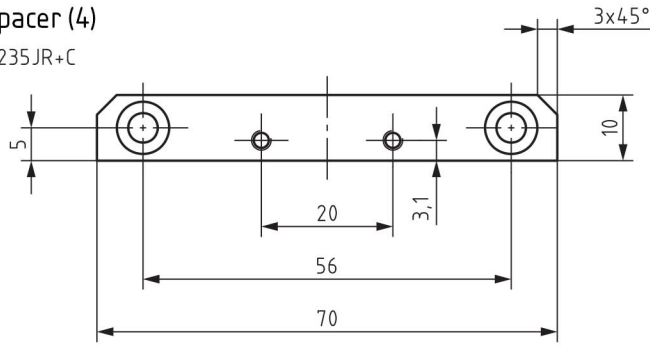
## Table leg (2)

2 pieces, S235 JR+C



**Spacer (4)**

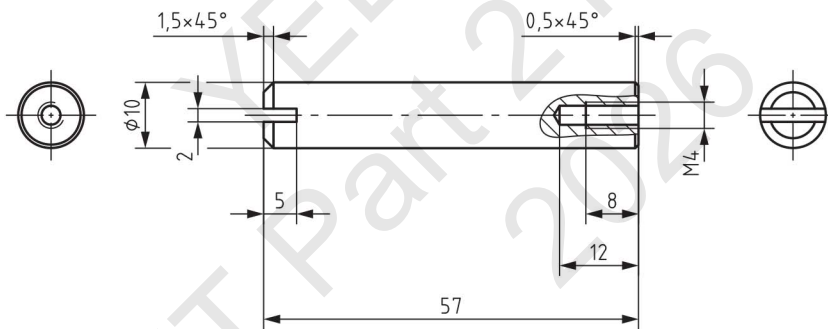
S235JR+C



Test taker is to choose for themselves the fastening screw (length) for fastening the spacer to the adapter plate.

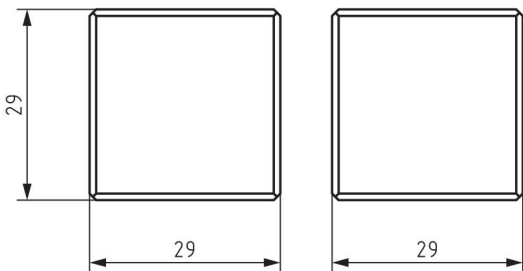
**Pusher (10)**

11SMn30+C



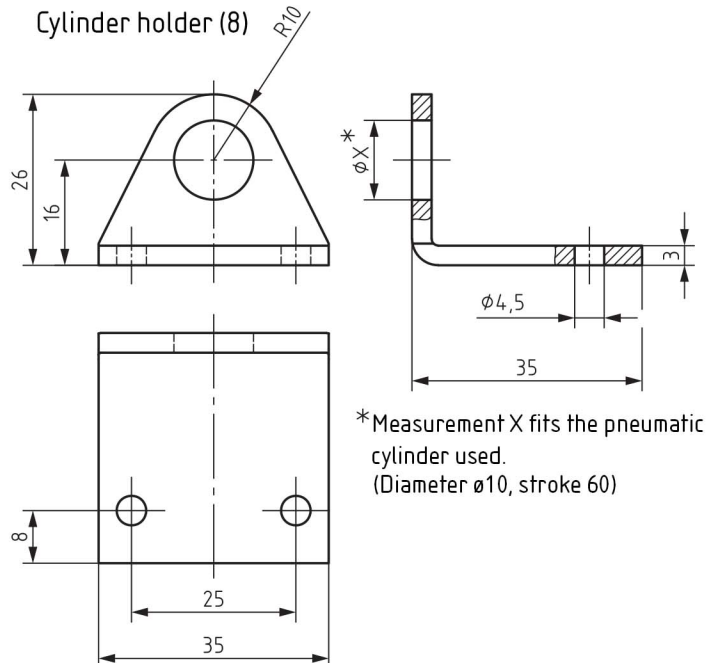
**Cube**

4 pieces, steel (e.g. 235JR)

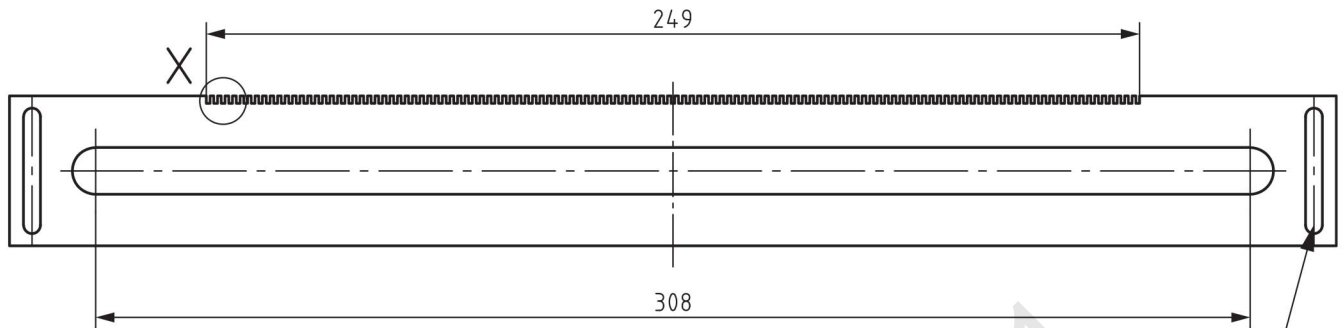


non-dimensioned chamfers 1x45°

**Cylinder holder (8)**

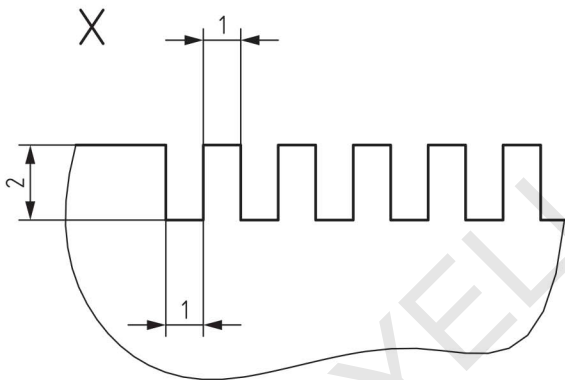


## Positioning plate (5)



External dimensions and the thickness of the positioning plate are to be determined by the test taker.

The fastening and spacing on the supports of the lower guide are to be determined by the test taker.



Note: The positioning plate can be manufactured according to the chosen material and assembled. 3D print files can be found at the following URL:

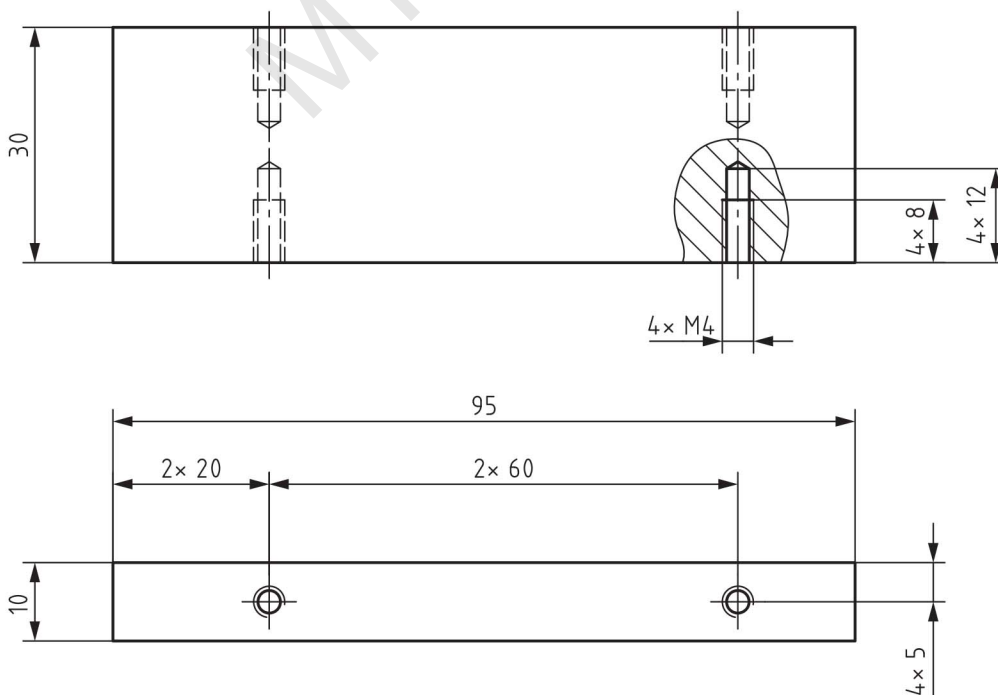
Test taker is to choose for themselves the fastening screws to be used to fasten the positioning plate to the axis module.

<https://www.ihk.de/stuttgart/pal/berufe-a-bis-z/mechatroniker-in-0942--5176024> and on the ICATT resource page.

## Magazine Part 1 (11)

**\*Each test taker must have their own flat steel (Item no. 11) as this piece will be modified during the examination.**

S235JR+C





# AHK

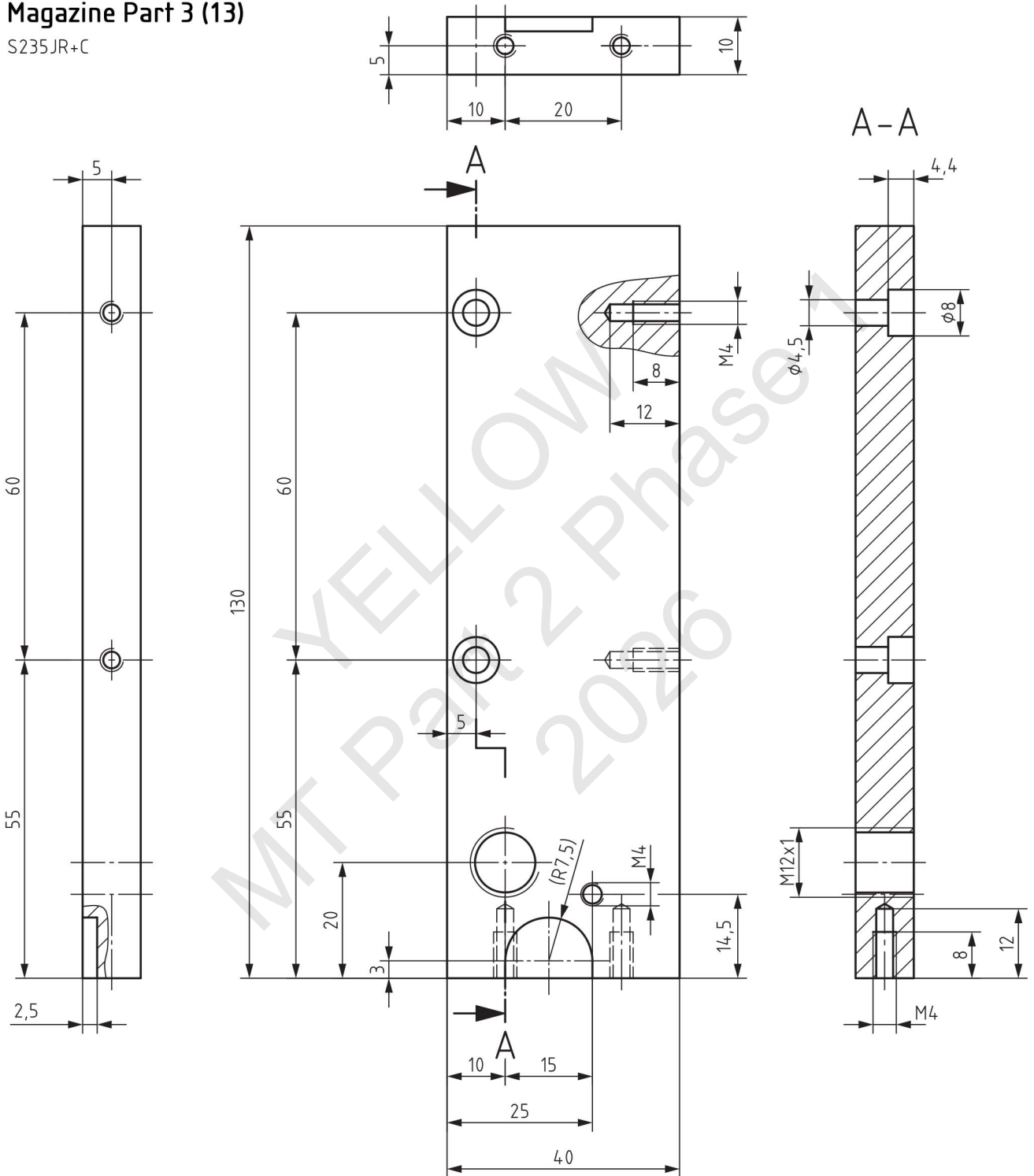
Final Examination Part 2 - 2026

Task  
Semi-finished parts

Mechatronics Technician

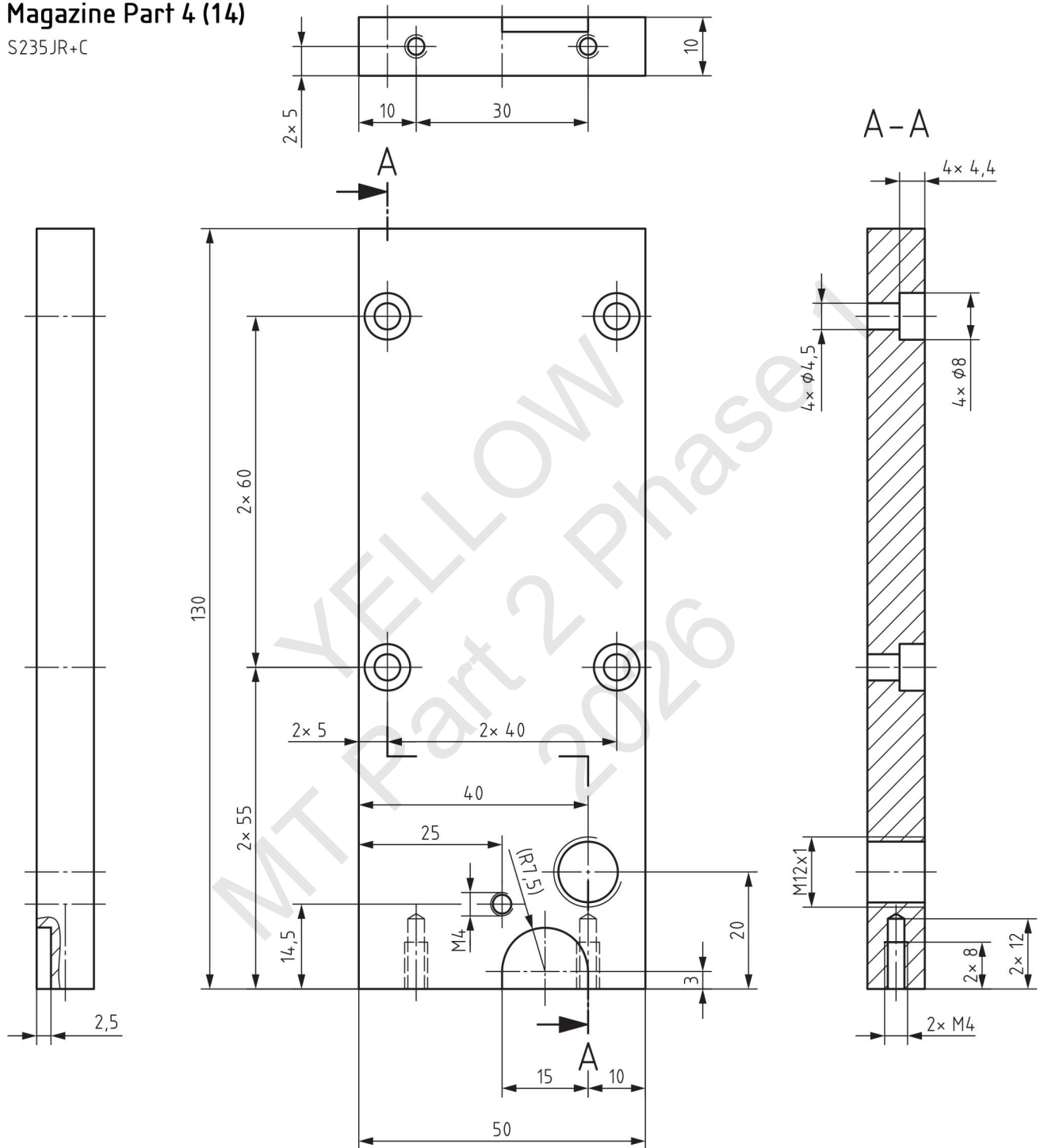
## Magazine Part 3 (13)

S235JR+C



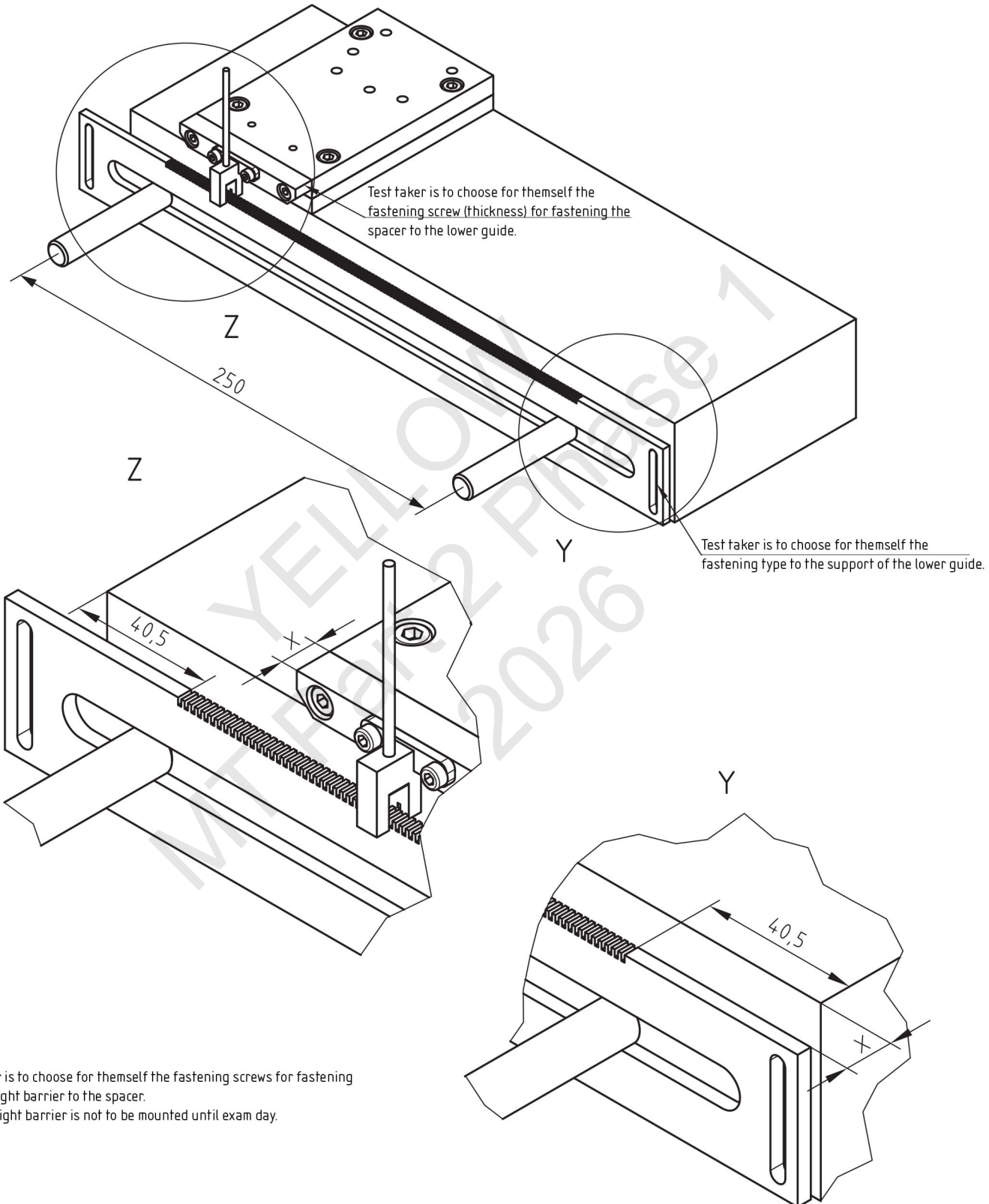
## Magazine Part 4 (14)

S235JR+C



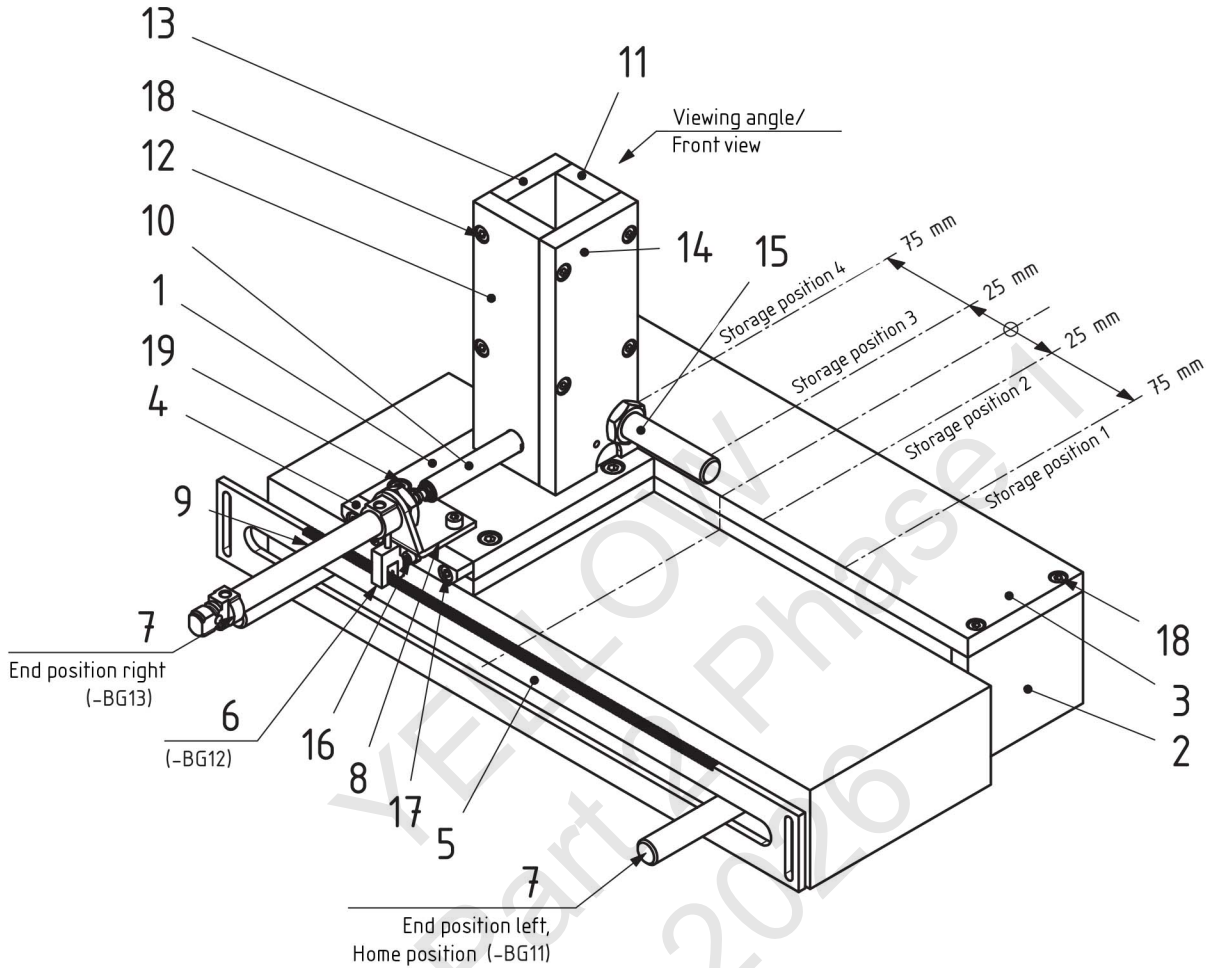
**Task**  
Complete Phase 1 assembly of the Unit

**Mechatronics Technician**



**Task**  
Complete Phase 1 assembly of the Unit with full BOM

**Mechatronics Technician**



Note:

The table must be fastened to the assembly grid

19	4	Cap screw M5 x 8	ISO 4762	8.8	
18	18	Cap screw M4 x 12	ISO 4762	8.8	
17	2	Cap screw M4 x 10	ISO 4762	8.8	
16	2	Cap screw M3 x 8	ISO 4762	8.8	
15	1	Inductive sensor			
14	1	Magazine Part 4		S235JR+C	Fl 50 x 10 x 130 EN 10278
13	1	Magazine Part 3		S235JR+C	Fl 40 x 10 x 130 EN 10278
12	1	Magazine Part 2		S235JR+C	Fl 40 x 10 x 130 EN 10278
11	1	Magazine Part 1		S235JR+C	Fl 30 x 10 x 95 EN 10278
10	1	Pusher		11SMn30+C	Rd 10 x 57 EN 10278
9	1	Pneumatic cylinder (stroke 60)			
8	1	Cylinder holder			
7	2	Inductive sensor			
6	1	Fork light barrier			
5	1	Positioning plate			40 x 4 x 354
4	1	Spacer		S235JR+C	4sq 10 x 70 EN 10278
3	1	Table top		S235JRC	Fl 70 x 10 x 300 EN 10278
2	2	Table leg		S235JRC	Fl 70 x 10 x 59 EN 10278
1	1	Adapter plate		S235JR+C	Fl 70 x 10 x 110 EN 10278
Item no.	Qty.	Designation	Standard	Material	Semi-finished product (according to materials provisioning list)

# AHK

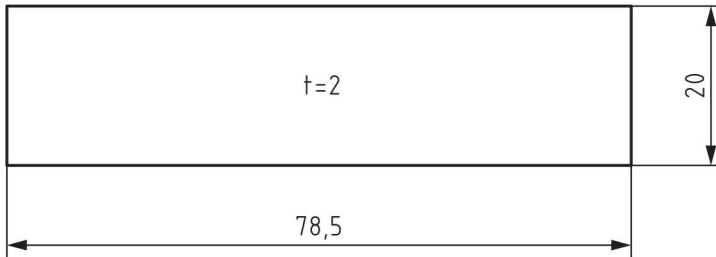
Final Examination Part 2 - 2026

Task  
Semi-finished parts without allocation in Phase 1  
or Phase 2

Mechatronics Technician

## Mounting bracket\*

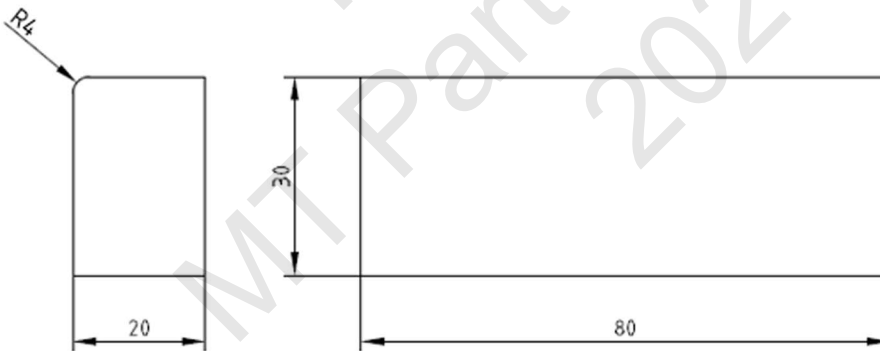
Aluminum, 1060



**\*Part should be brought to the exam per the specifications in this drawing.  
Each test taker must have their own aluminum piece for the mounting bracket.  
Alternative and recommended material for mounting bracket:  
McMaster-Carr MMC# 2471T87 1100 aluminum**

## Bending aid

Flat steel bending aid  $30 \times 20 \times 80$  EN 10278 for bending sheet metal, see drawing below.



# AHK

Final Examination Part 2 - 2026

**Practical Task overview**  
**Switch cabinet, control unit, wiring diagrams**

**Mechatronics Technician**

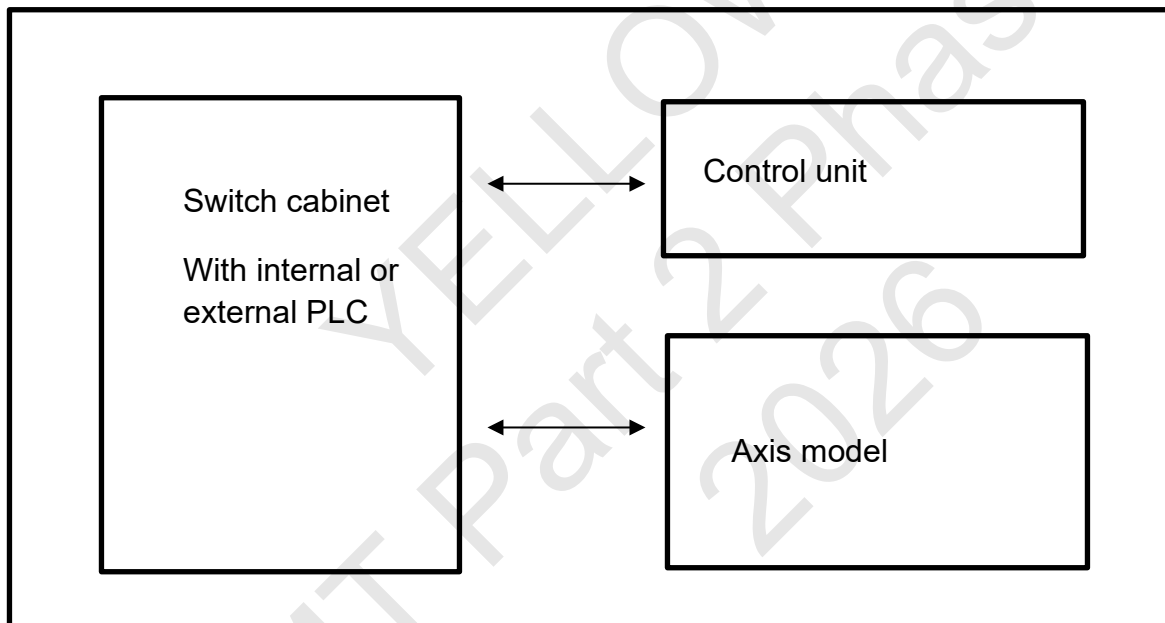
## General

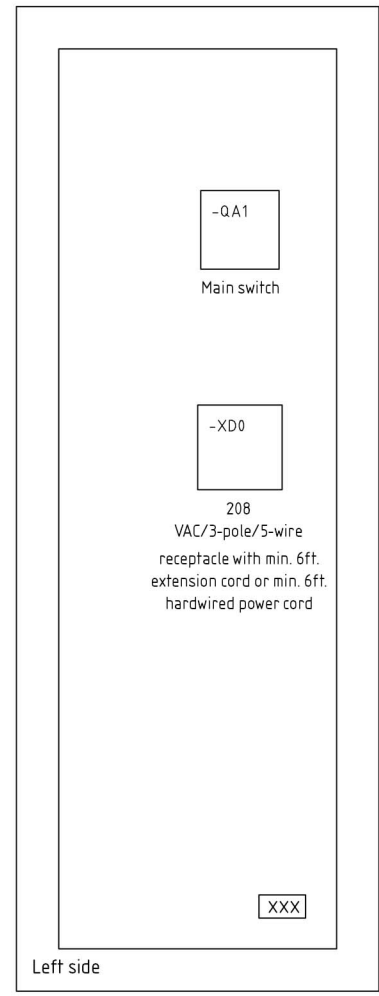
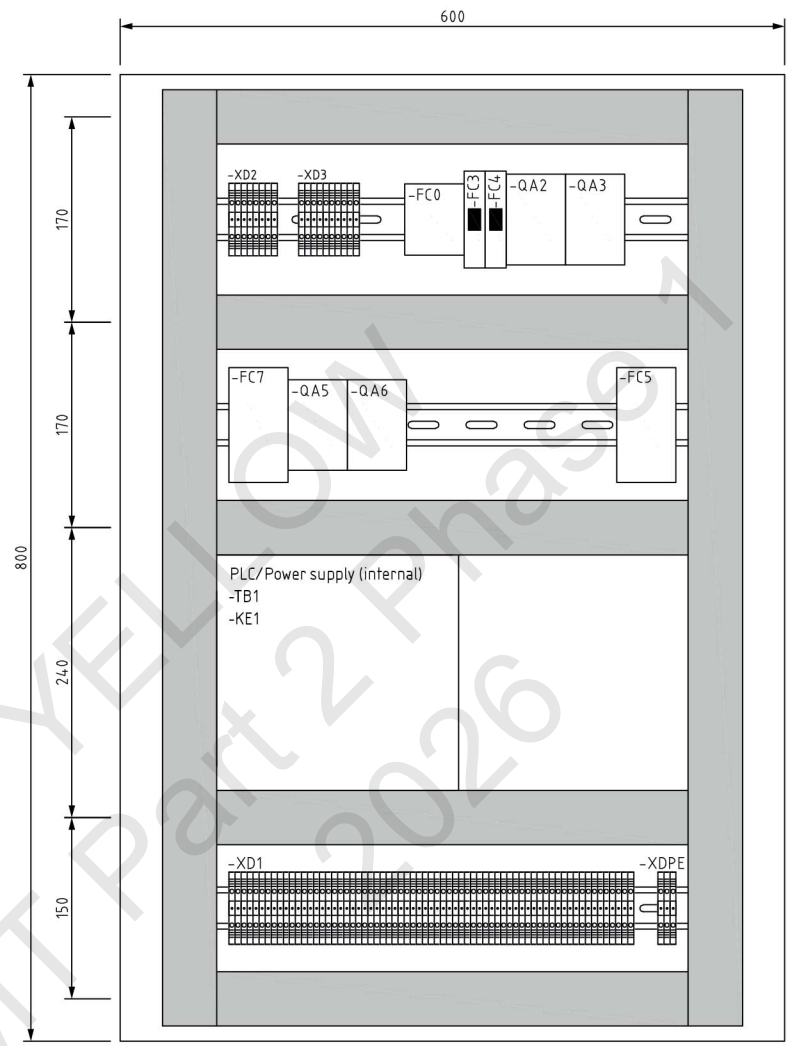
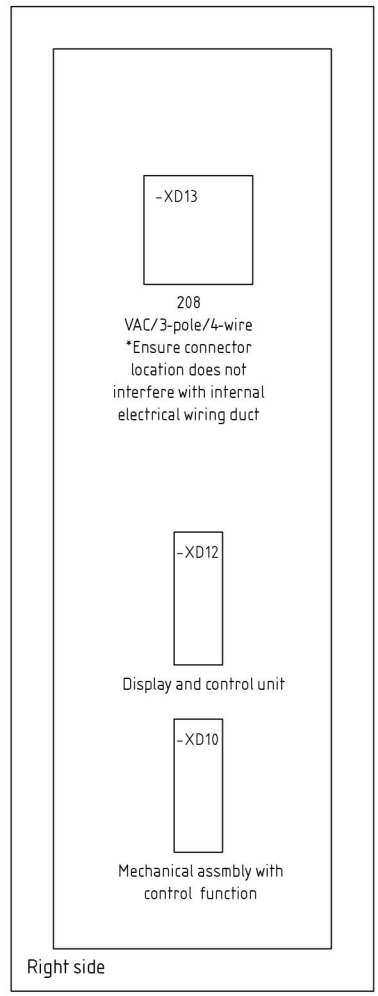
The switch cabinet and control unit are prewired as per the following documents and later attached to the axis module by connectors.

The next page shows a possible layout for the switch cabinet (wiring not shown). The position of the materials and components used can be changed if necessary; note changes on this yellow preparation documentation.

**The power is connected using an extension cable.**

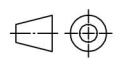
The figure below shows the relationship between the different components.



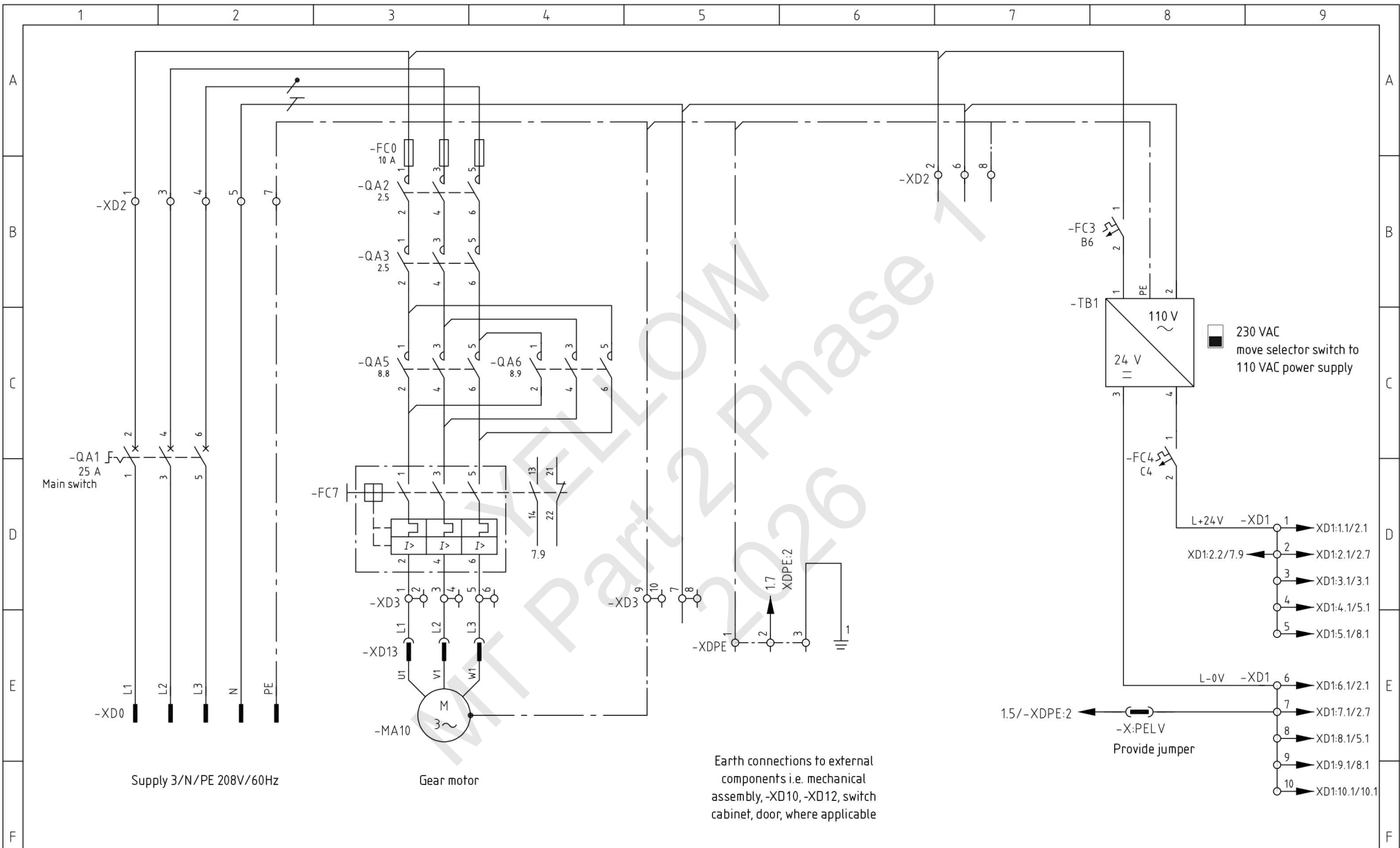


Note: - the image above shows a possible configuration of the switch cabinet  
- adjust positioning as needed

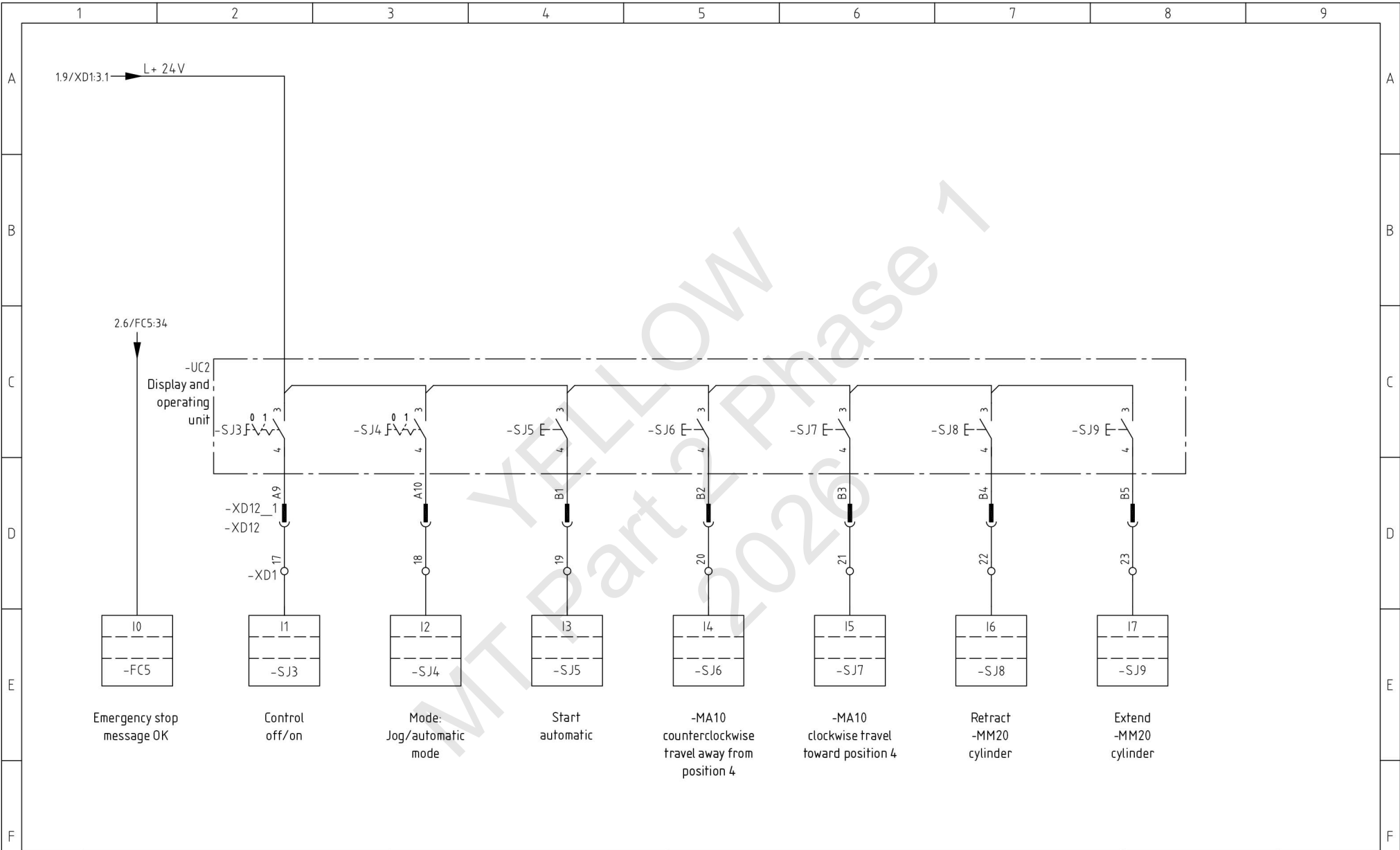
- ① plug connector - control/display unit (make sure not to mix these up)
- ② plug connector - mechanical assembly with control engineering function (make sure not to mix these up)



<b>AHK</b>	Final Examination Part 2 - 2026	Assembly Drawing		
	Mechatronics Technician			Sheet: 1







1 2 3 4 5 6 7 8 9

A

B

C

D

E

F

A

B

C

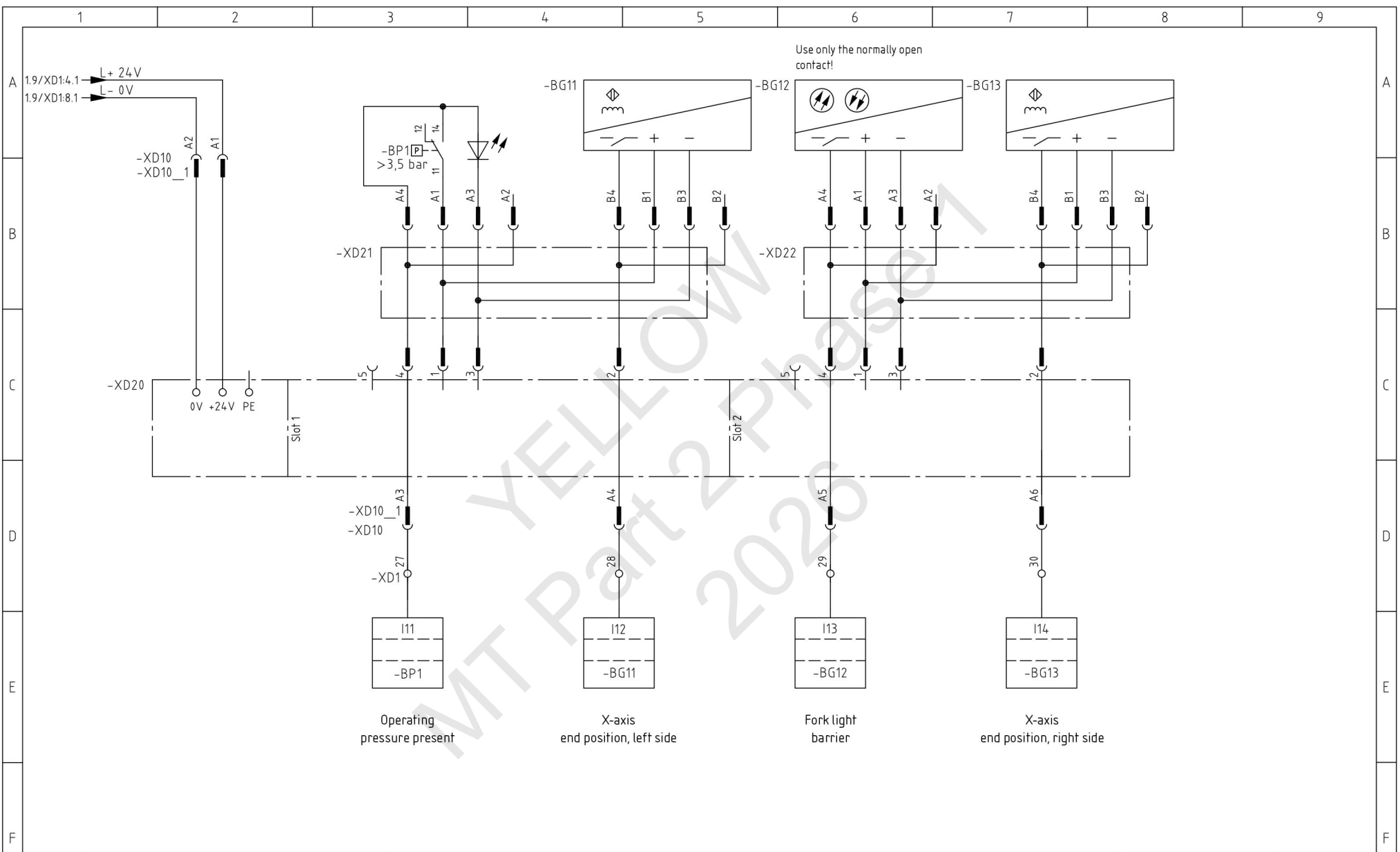
D

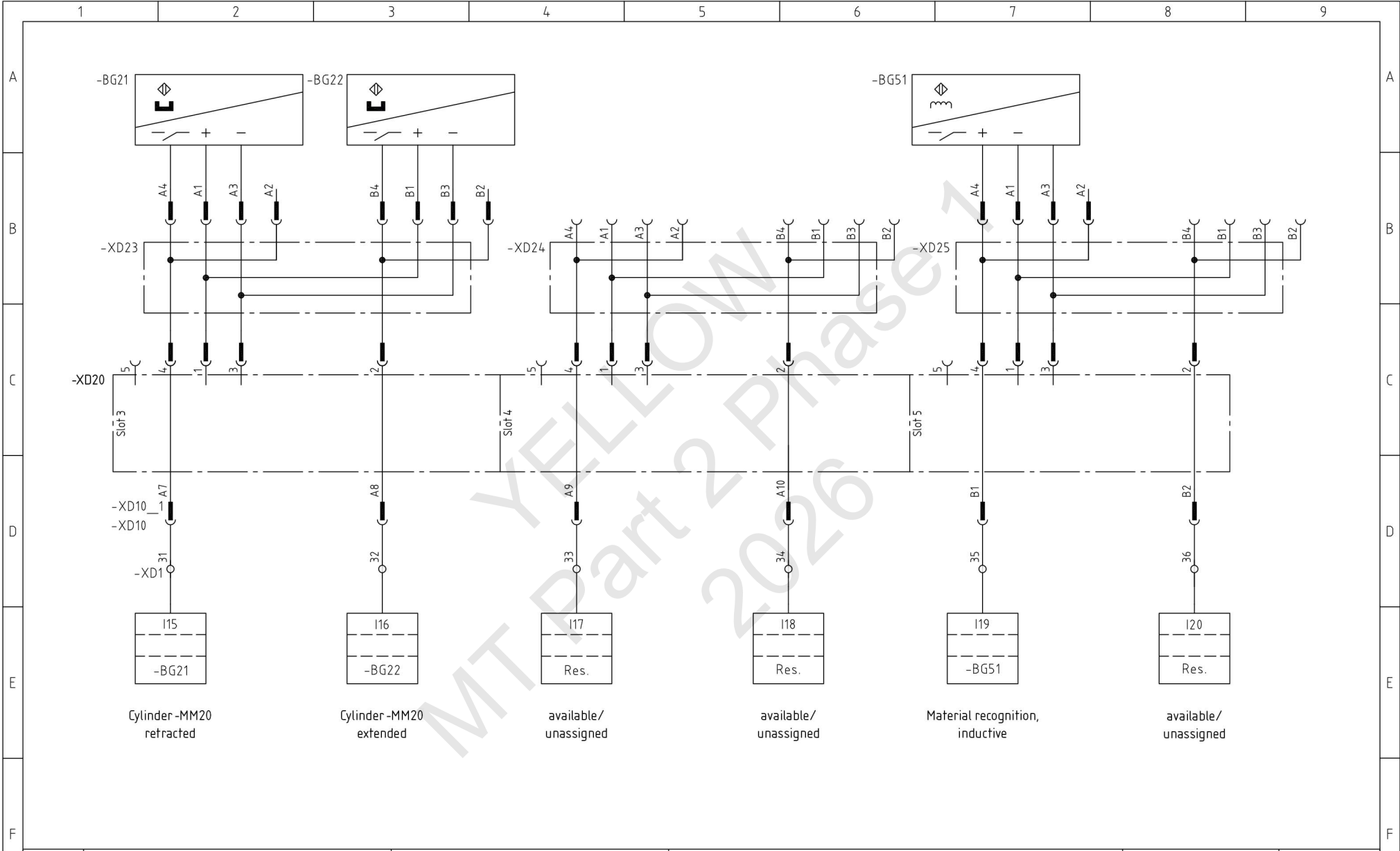
E

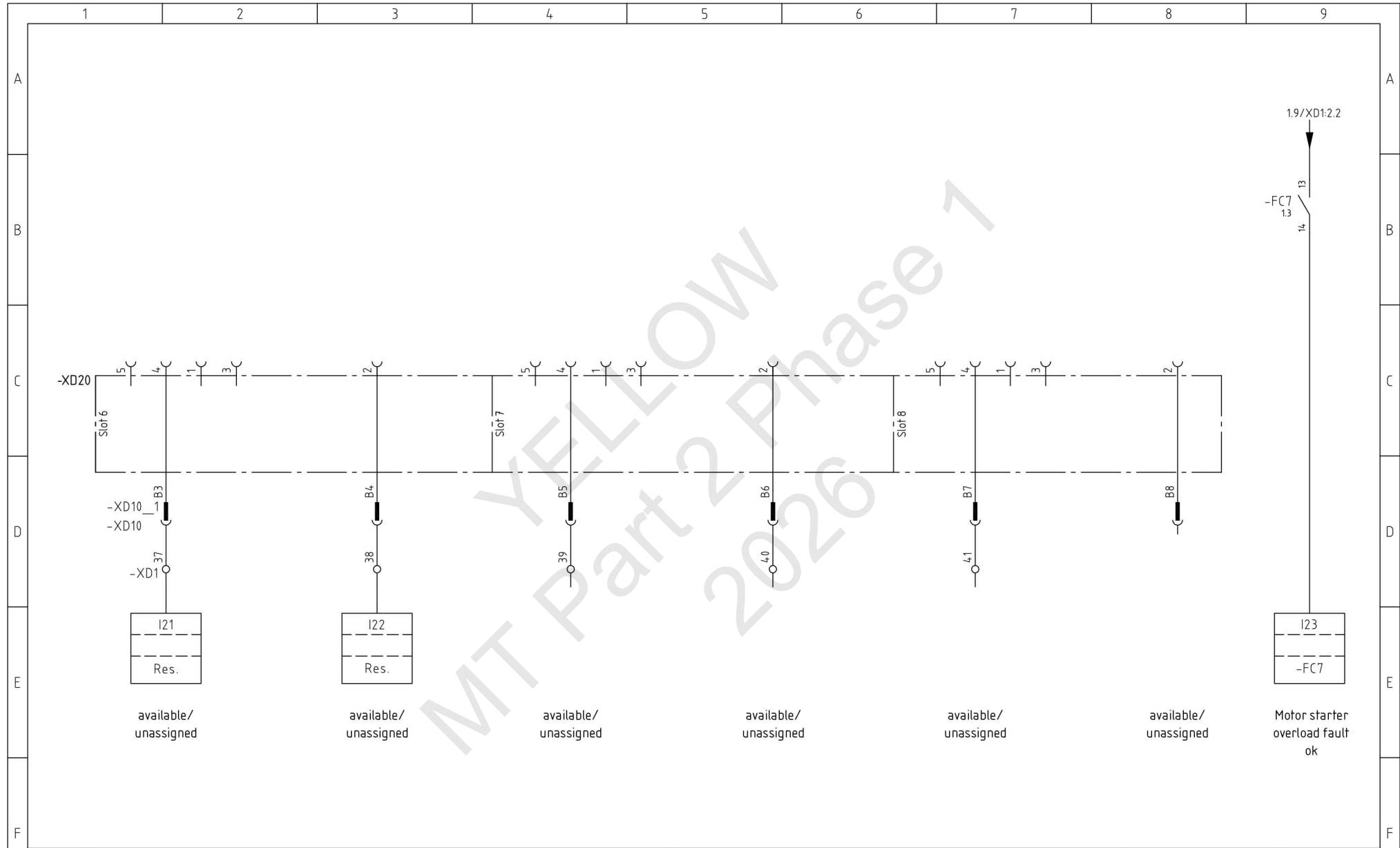
F



MYELLOW  
Part 2 Phase 1  
2026







available/  
unassigned

available/  
unassigned

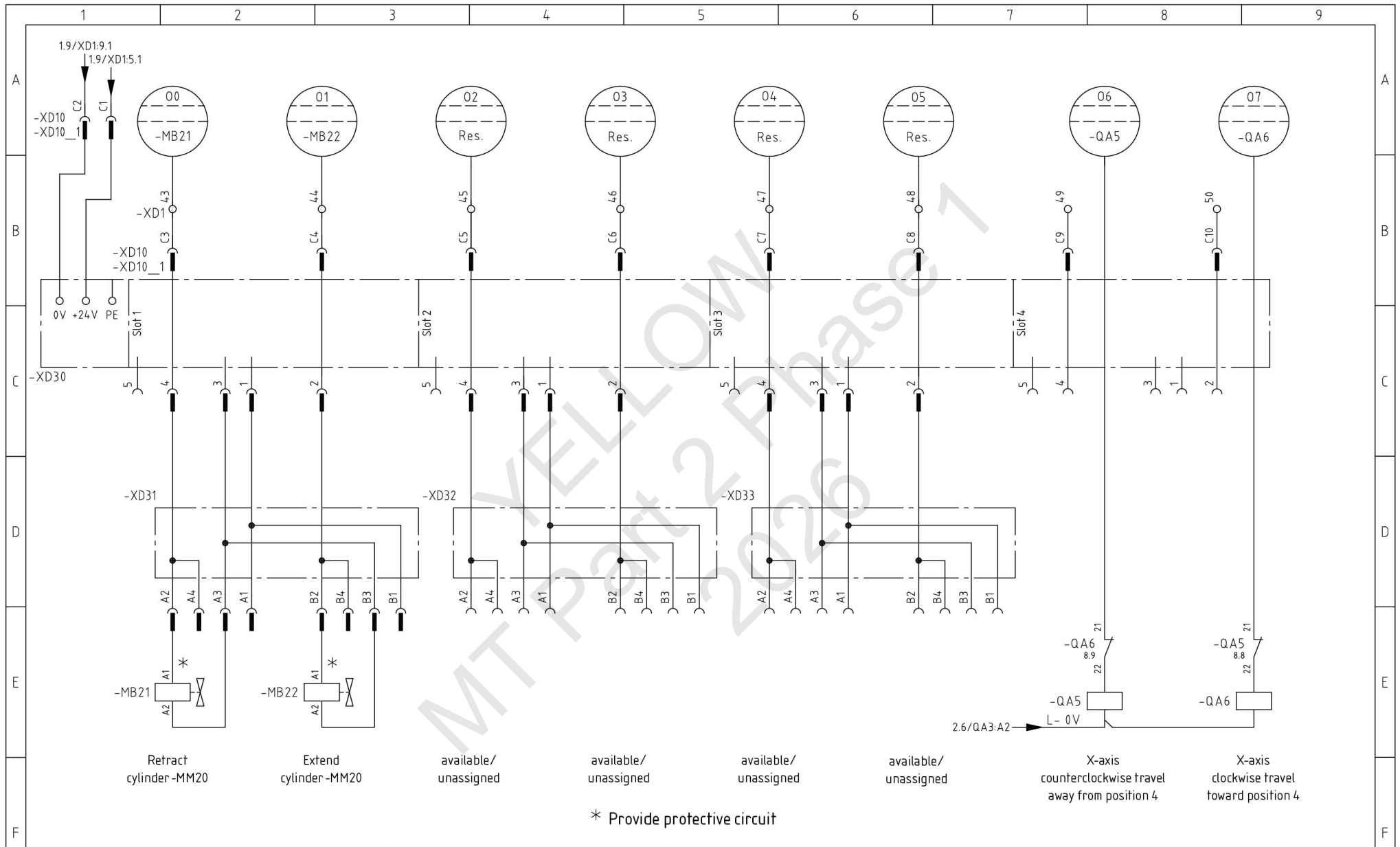
available/  
unassigned

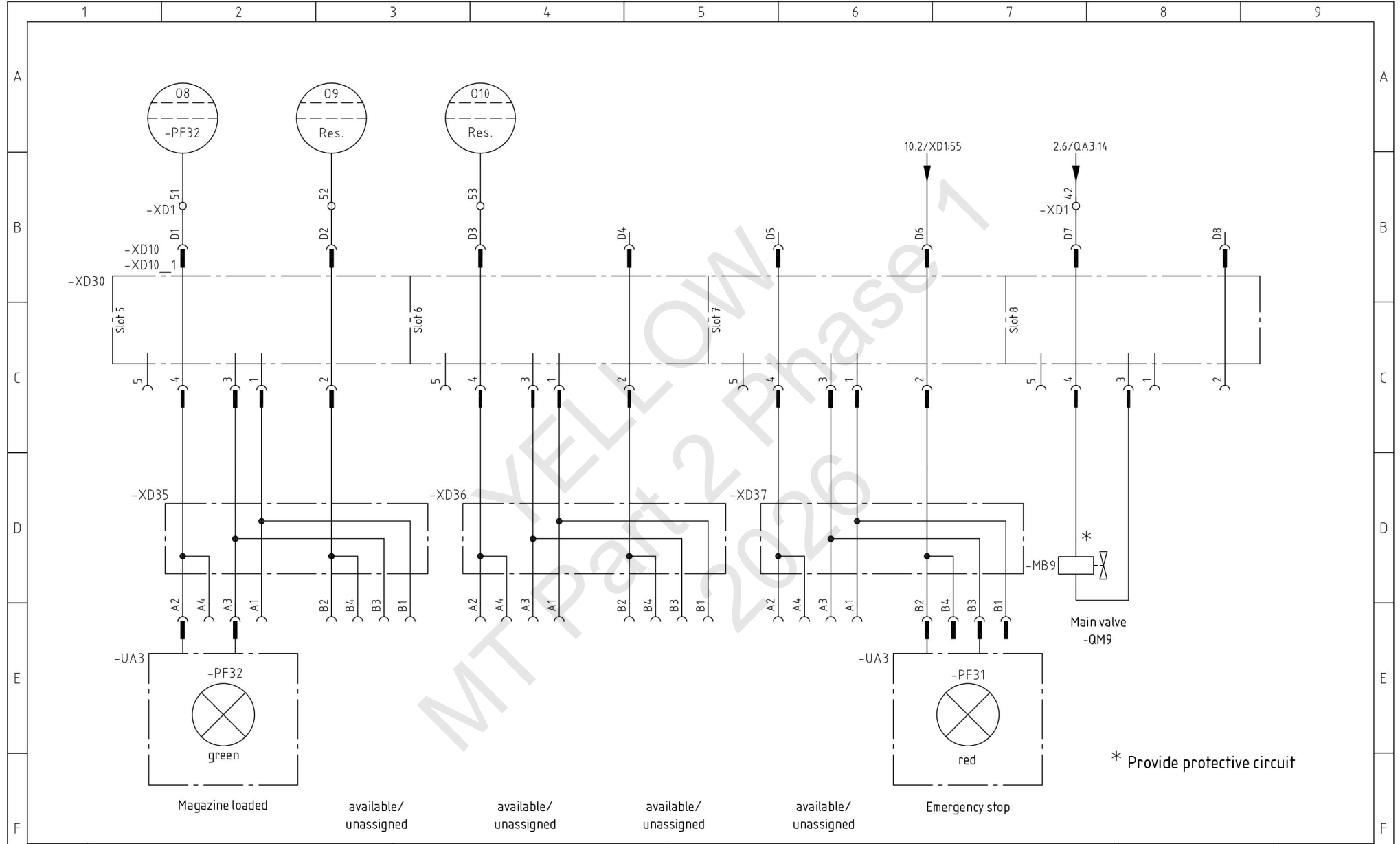
available/  
unassigned

available/  
unassigned

available/  
unassigned

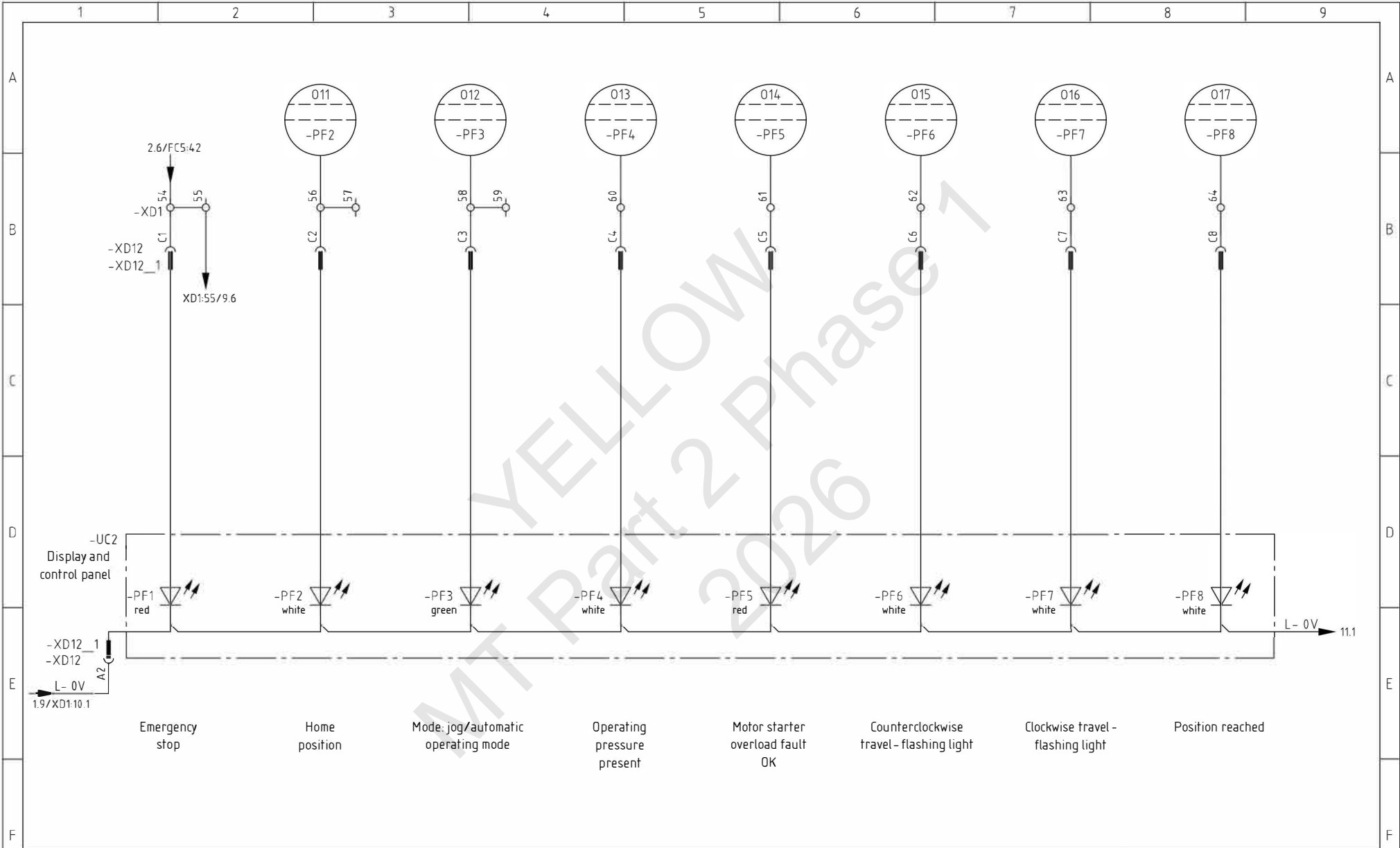
Motor starter  
overload fault  
ok

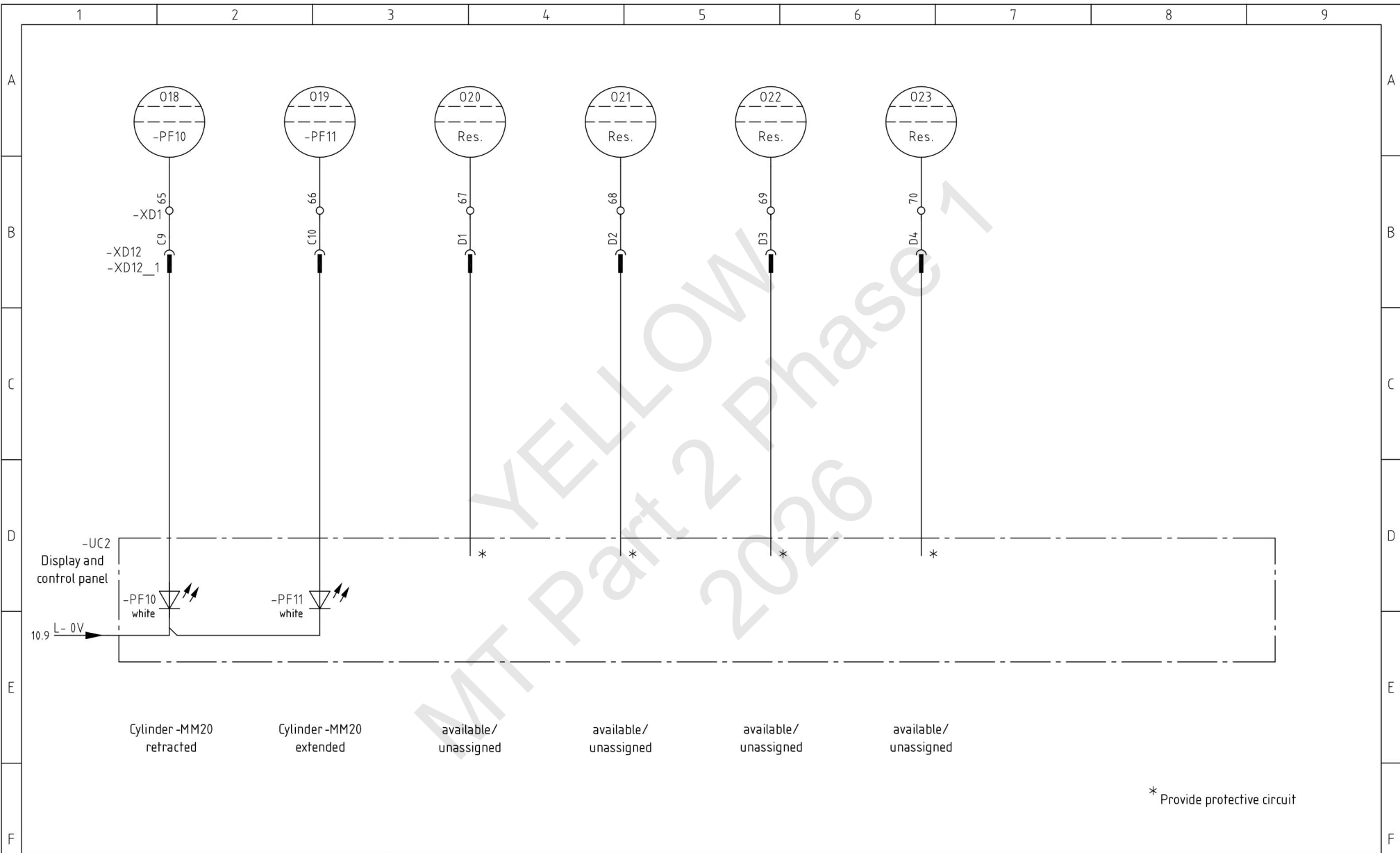




\* Provide protective circuit

AHK	Final Examination Part 2 - 2026	Preparation			Sheet: 9(14)
	Mechatronics Technician				



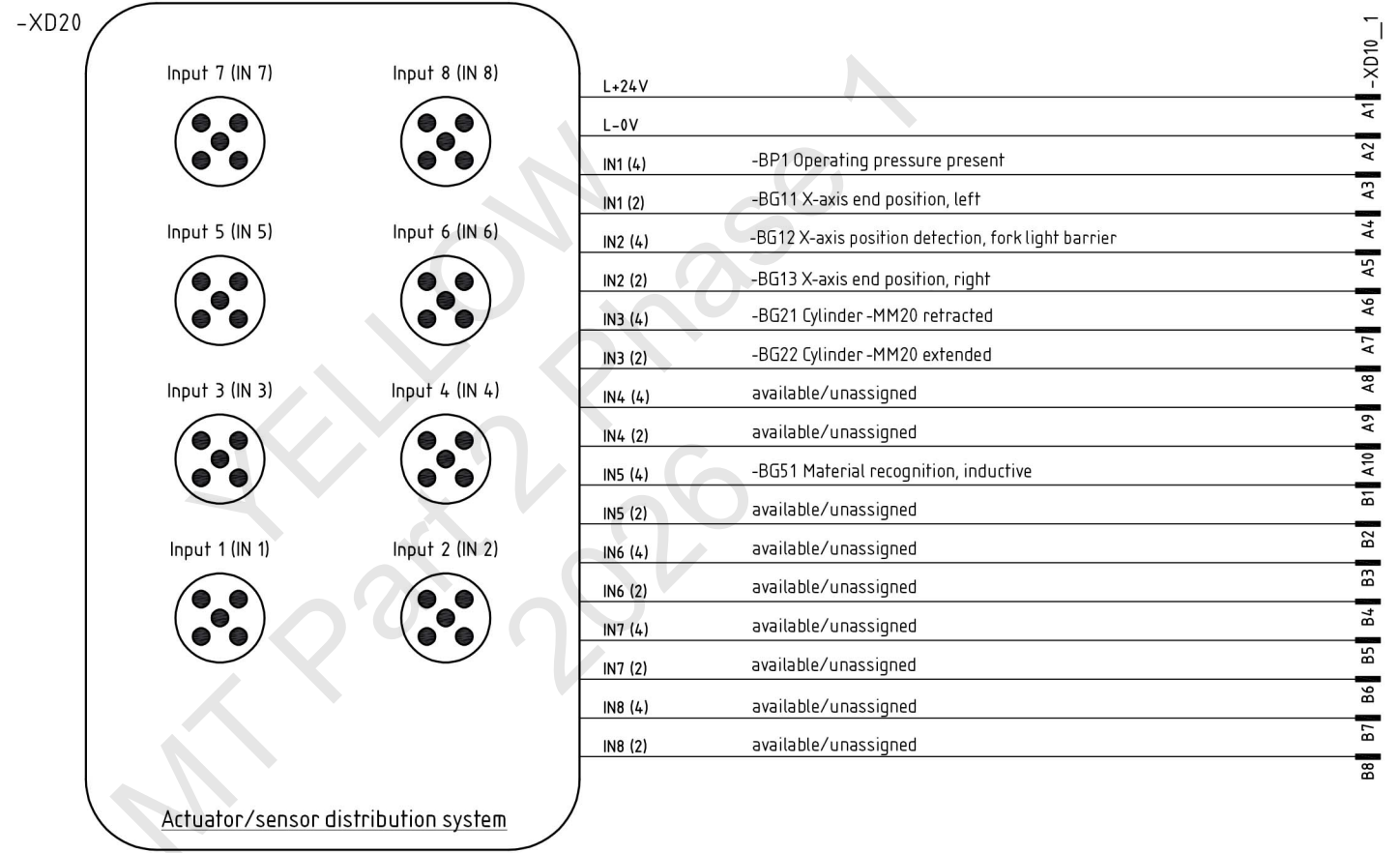


\* Provide protective circuit

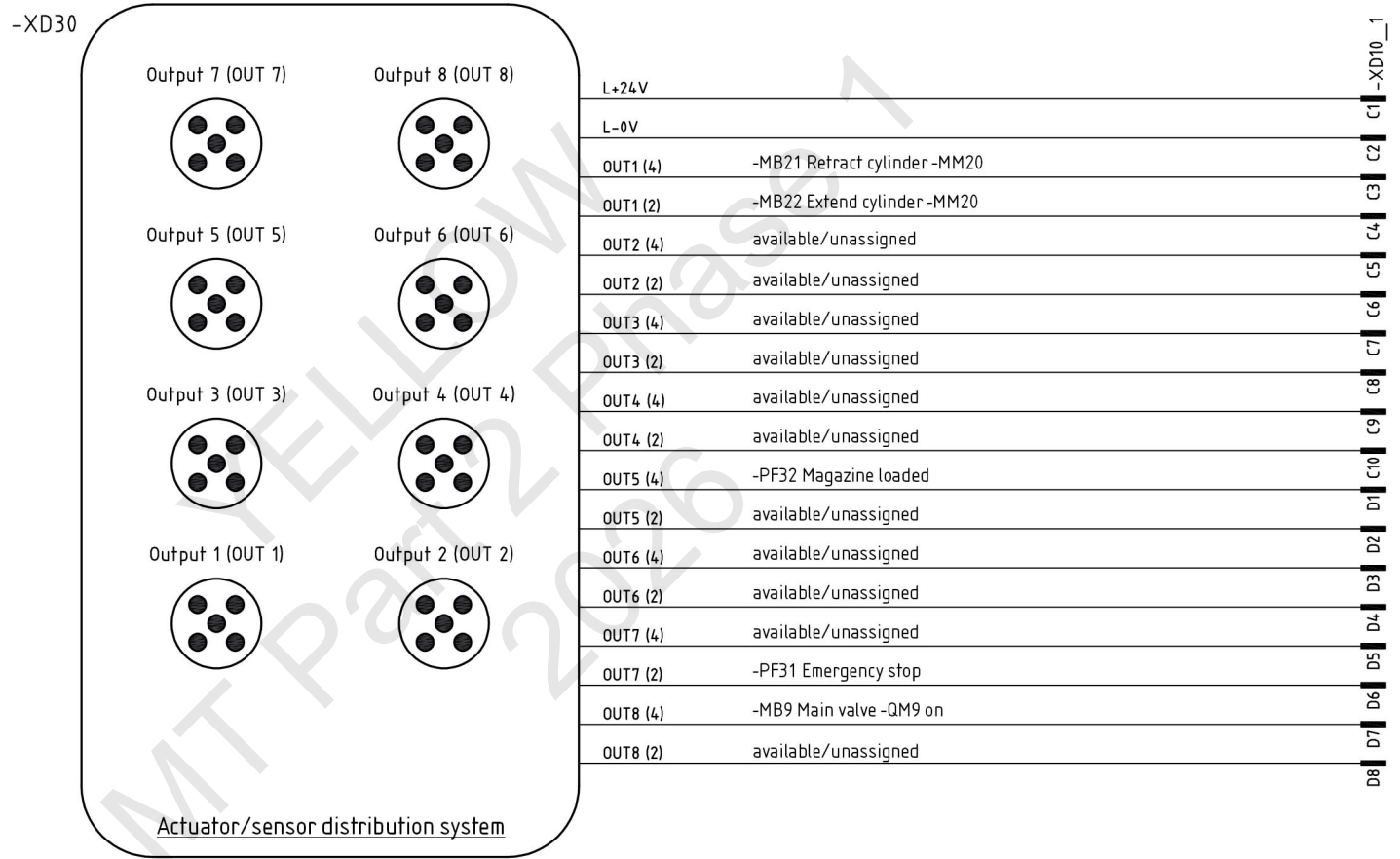
AHK	Final Examination Part 2 - 2026	Preparation			Sheet:11(14)
	Mechatronics Technician				

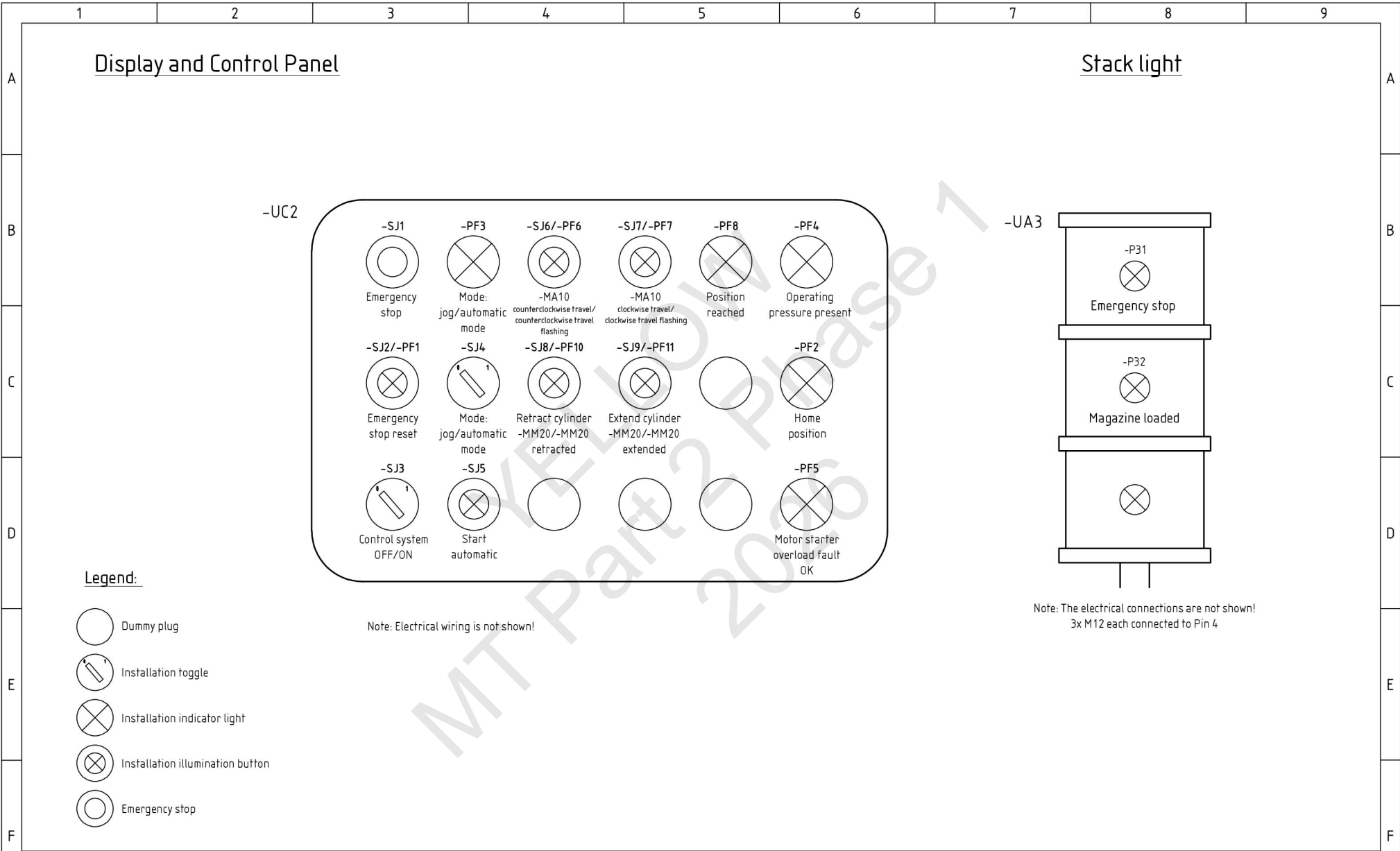
1 2 3 4 5 6 7 8 9

Sensors → mechanical subassembly



Sensors → mechanical subassembly





Display and Control Panel

Stack light

-UC2

-UA3

Legend:

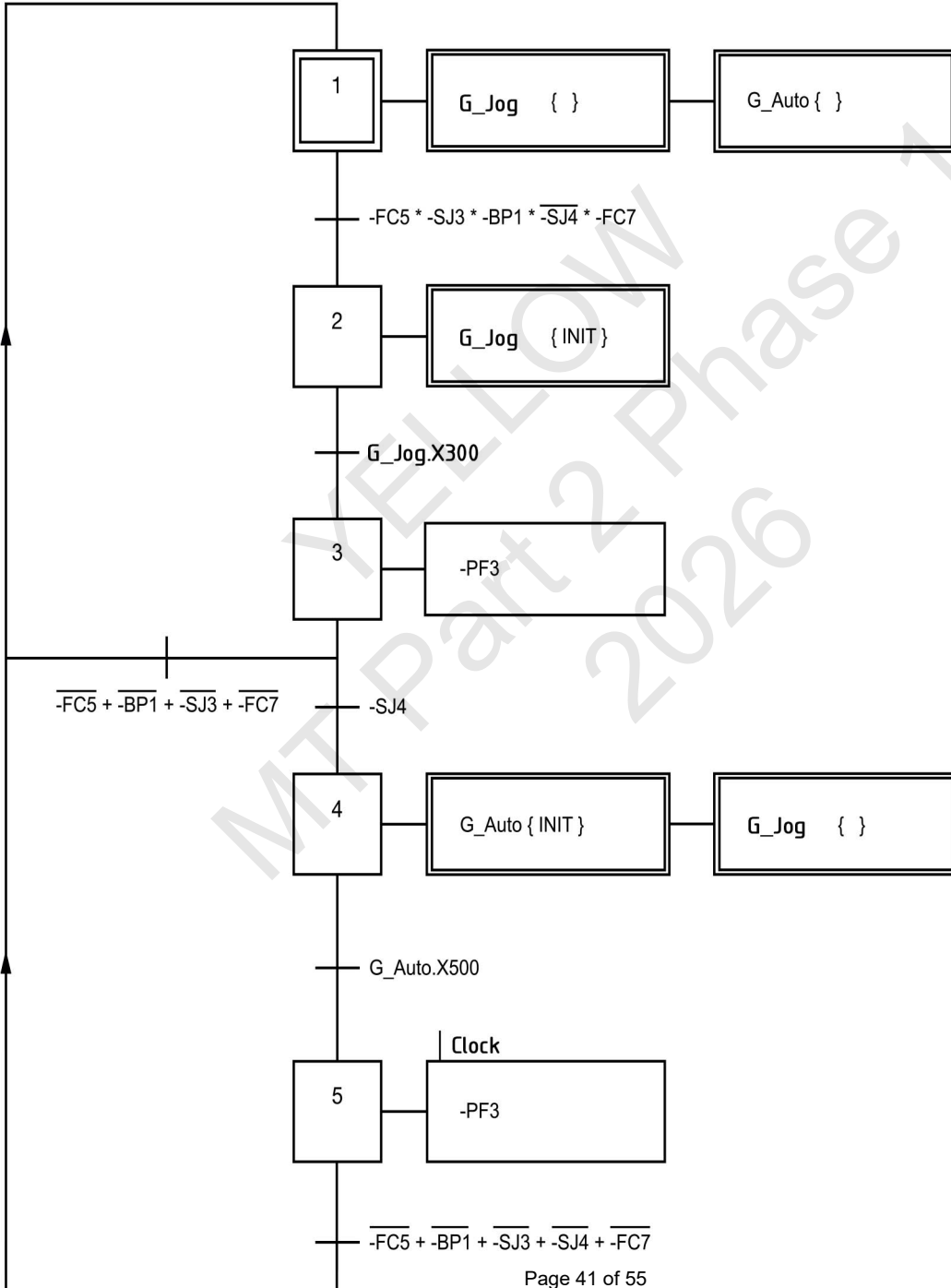
-  Dummy plug
-  Installation toggle
-  Installation indicator light
-  Installation illumination button
-  Emergency stop

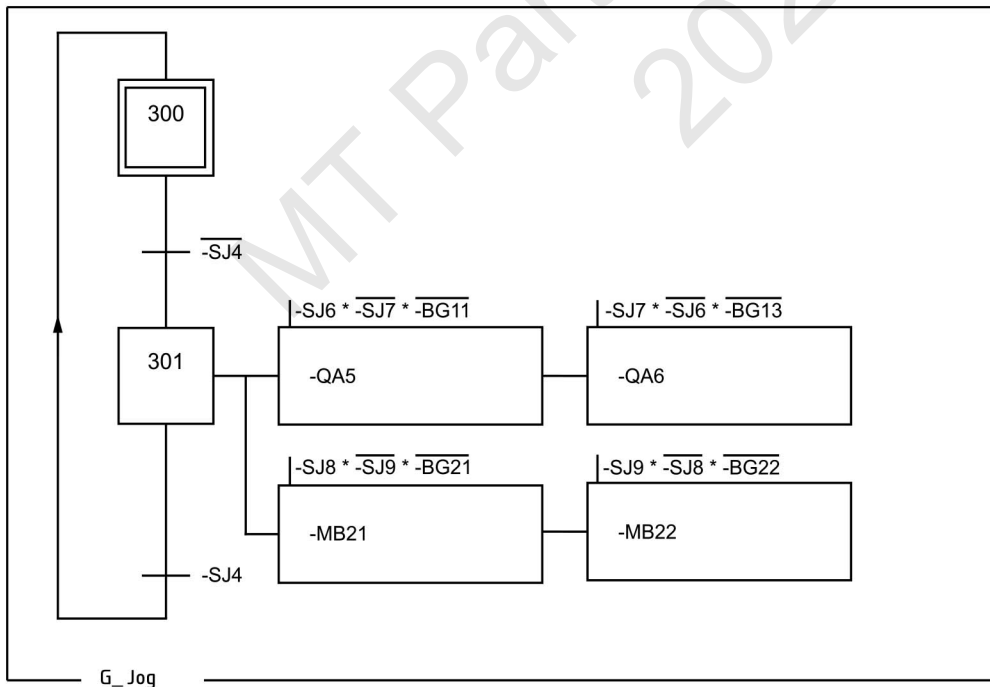
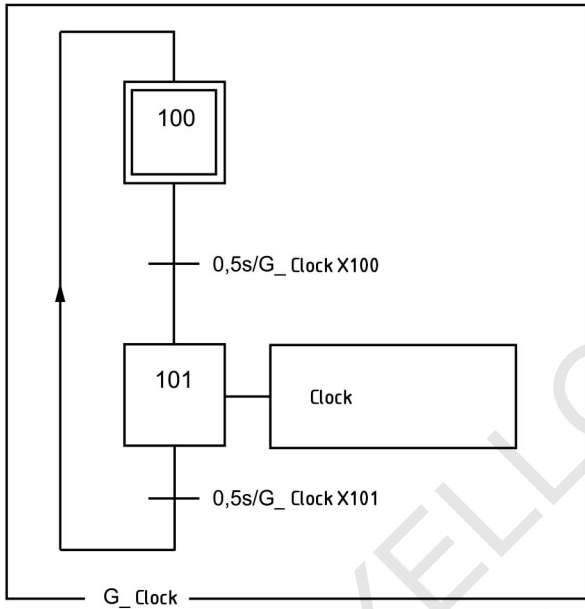
Note: Electrical wiring is not shown!

Note: The electrical connections are not shown!  
3x M12 each connected to Pin 4

Preparation Task  
Workflow according to  
GRAFSET

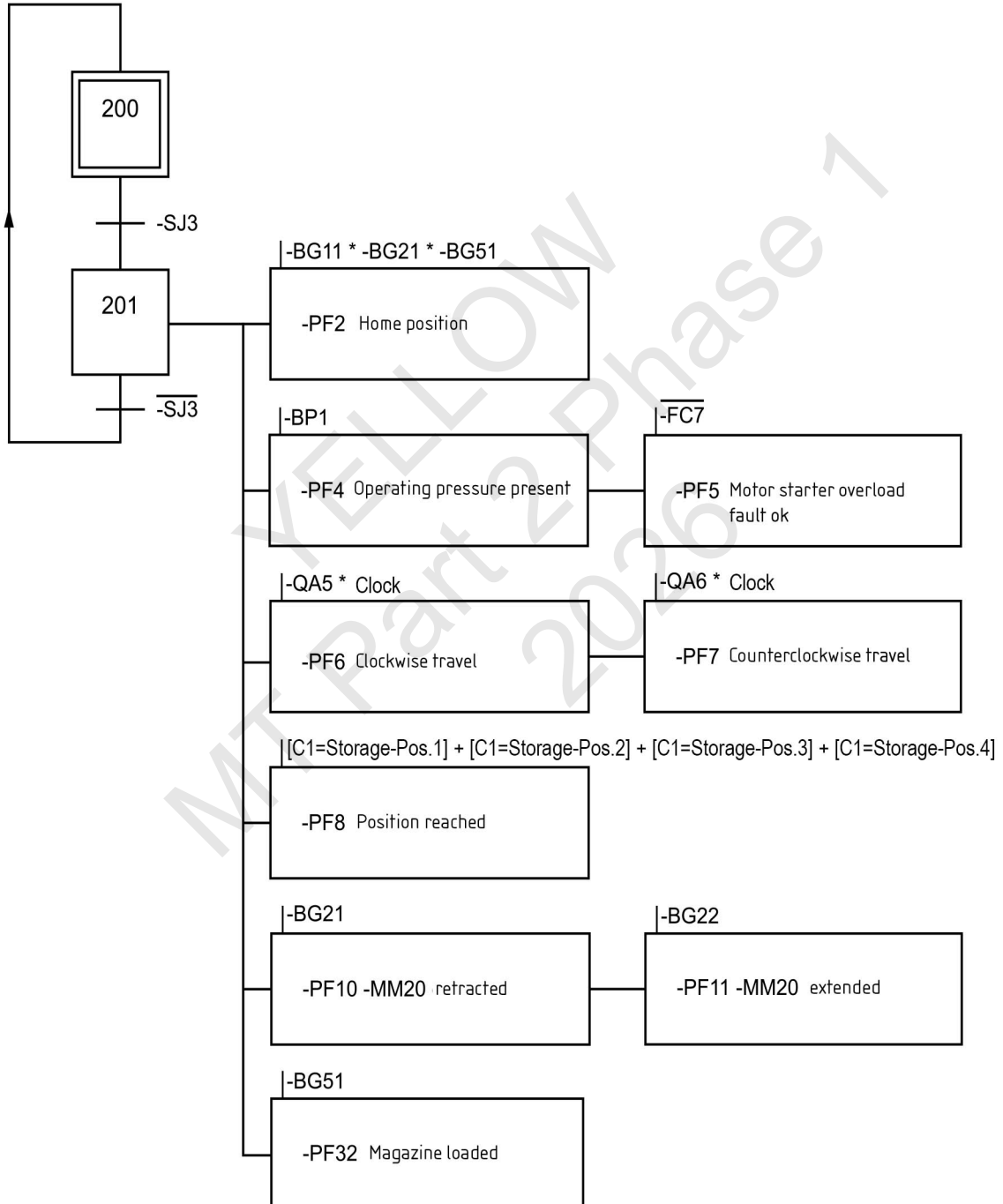
Mechatronics Technician

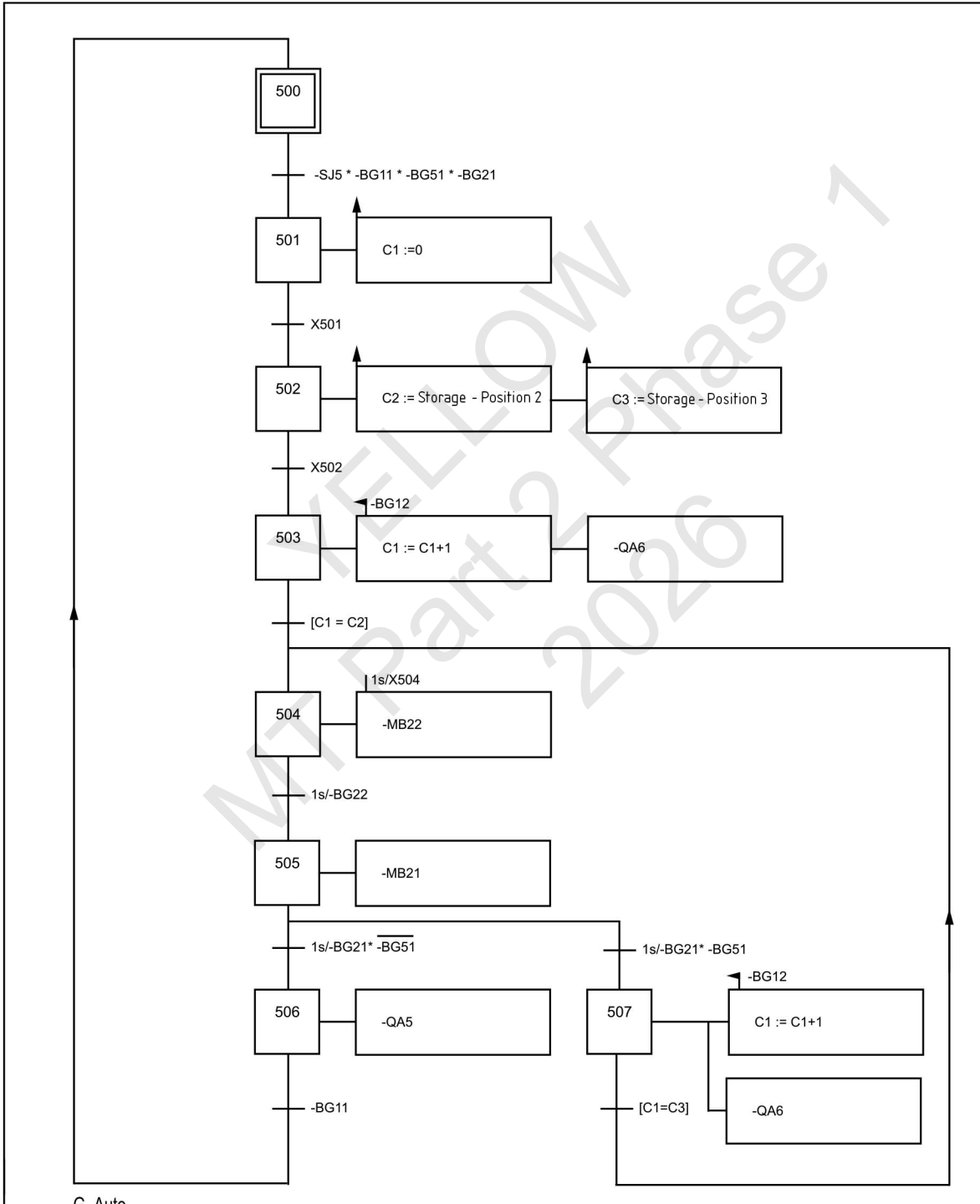




**Preparation Task**  
Workflow according to  
**GRAFSET**

**Mechatronics Technician**





**AHK**

Final Examination Part 2 - 2026

**Preparation of the Practical task:**  
**PLC**  
**Input assignment list**

**Mechatronics Technician**

System related operands are to be entered here.

Inputs	Operand	Equipment identifier	Function
I0		-FC5	Emergency stop message ok
I1		-SJ3	Control system ON/OFF
I2		-SJ4	Mode: Jog/automatic mode
I3		-SJ5	Start automatic
I4		-SJ6	-MA10 counterclockwise travel away from position 4
I5		-SJ7	-MA10 clockwise travel toward position 4
I6		-SJ8	Cylinder -MM20 retract
I7		-SJ9	Cylinder -MM20 extend
I8		-	-
I9		-	-
I10		-	-
I11		-BP1	Operating pressure present
I12		-BG11	X-axis, End position left side or Home position
I13		-BG12	Fork light barrier
I14		-BG13	X-axis, End position right side
I15		-BG21	Cylinder -MM20 retracted
I16		-BG22	Cylinder -MM20 extended
I17		-	-
I18		-	-
I19		-BG51	Material recognition (inductive)
I20		-	-
I21		-	-
I22		-	-
I23		-FC7	Motor starter overload fault
I24		-	-
		-	-
		-	-
		-SJ1	Emergency stop
		-SJ2	Emergency stop reset

**AHK**

Final Examination Part 2 - 2026

**Preparation of the Practical task:**  
**PLC**  
**Output assignment list**

**Mechatronics Technician**

System related operands are to be entered here.

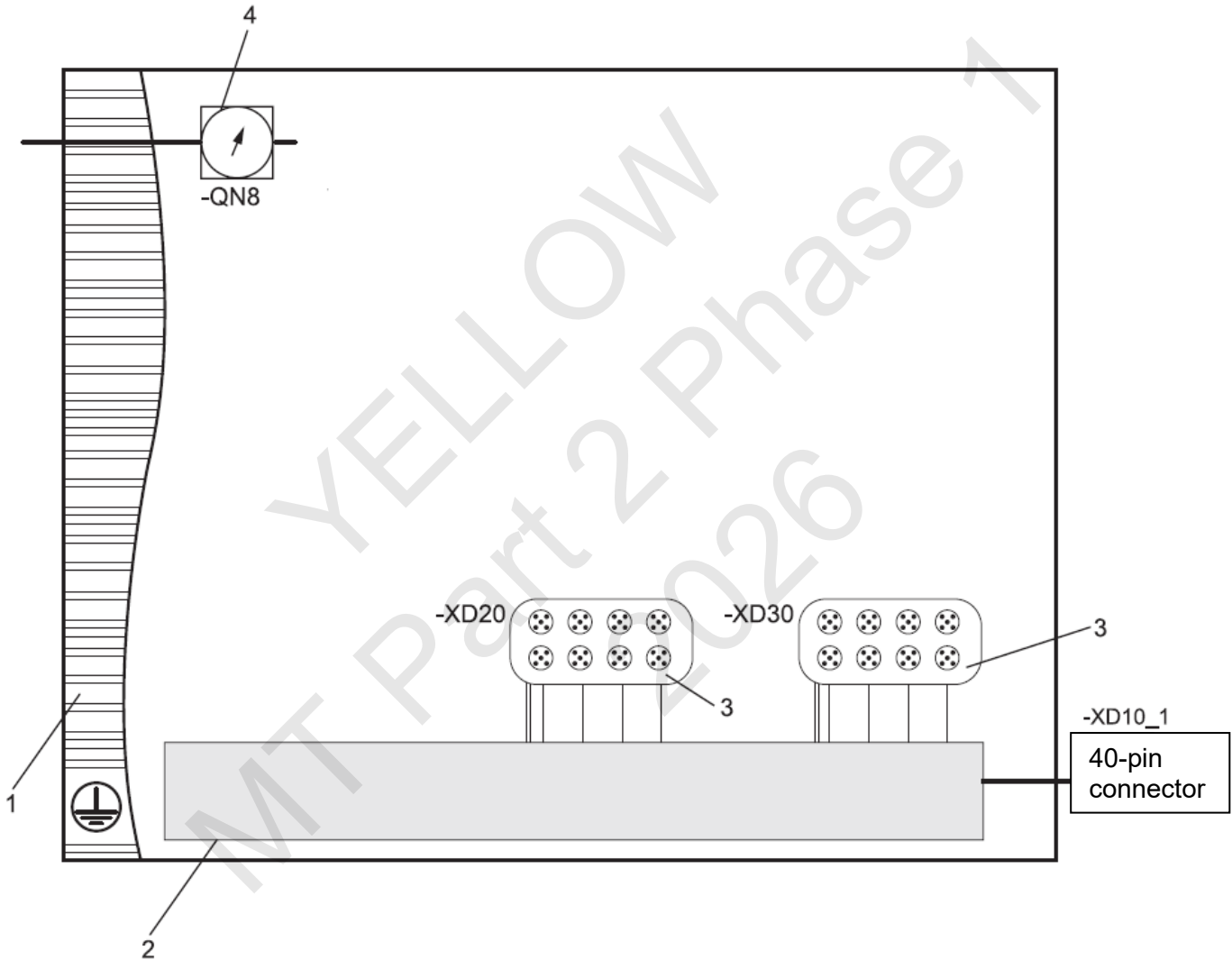
Outputs	Operand	Equipment identifier	Function
O0		-MB21	Cylinder -MM20 retract
O1		-MB22	Cylinder -MM20 extend
O2		-	-
O3		-	-
O4		-	-
O5		-	-
O6		-QA5	Carriage slide counterclockwise rotation away from pos. 4
O7		-QA6	Carriage slide clockwise rotation toward pos 4
O8		-PF32	Magazine loaded
O9		-	-
O10		-	-
O11		-PF2	Home position
O12		-PF3	Mode: Jog/automatic operating mode
O13		-PF4	Operating pressure present
O14		-PF5	Motor starter overload fault ok
O15		-PF6	Counterclockwise travel - flashing light
O16		-PF7	Clockwise travel - flashing light
O17		-PF8	Position reached
O18		-PF10	Cylinder -MM20 retracted
O19		-PF11	Cylinder -MM20 extended
O20		-	-
O21		-	-
O22		-	-
O23		-	-
		-	-
		-PF31	Emergency stop
		-MB9	Main valve -QM9

**AHK**

Final Examination Part 2 - 2026

**Preparation of the practical assignment  
Pre-assembly drawing****Mechatronics Technician**

4	1	-QN8	Pressure regulator with gage	Stand. Mat. List pages 5-8
3	2	-XD20,-XD30	Actuator/sensor distributor system	Stand. Mat. List pages 5-8
2	1		Wiring duct	Stand. Mat. List pages 5-8
1	1		Mounting plate	Stand. Mat. List pages 5-8
Item No.	Quantity	Identification	Description	Comments

Please note:

1. The drawing is a **diagram** and not to scale!
2. Stack light is not shown!
3. Pre-wiring and plumbing of hoses are in accordance with the diagrams/information in this booklet
4. **Modify diagram according to the "Preparation of the practical assignment –work order" showing only items connected in your PHASE 1 documentation and items added in steps 1-6 of your PHASE 2 documentation.**

# AHK

Final Examination Part 2 - 2026

**Preparation of the Practical task:  
Pneumatic diagram**

**Mechatronics Technician**

