



Management  
System  
ISO 9001:  
  
www.tuv.com  
ID 9105073698

## Automation of Horizontal Die Casting Machines



\*Based on the geometrical measurements of the DCM and manipulators. For more details, see the respective specifications.

| Automation for DCM Range 50 to 380 t |                |                  |                    |
|--------------------------------------|----------------|------------------|--------------------|
| Description                          | Type           | DCM Range        | DCM Type           |
| Rotational Ladle                     | FEEDMAT-3 (F3) | 130 - 380 t      | Cold Chamber       |
| Linear Ladle                         | DM-1           | 130 - 380 t      | Cold Chamber       |
| Sprayer                              | SH-1P          | 50 - 80 t        | Hot Chamber        |
| Sprayer                              | SH             | 80 - 315 t       | Cold / Hot Chamber |
| Sprayer                              | SC             | 130 - 380 t      | Cold Chamber       |
| 3-Axis Extractor                     | EL             | 80 - 130 t       | Cold / Hot Chamber |
| 4-Axis Extractor                     | ELT            | 80 - 200 (315) t | Cold / Hot Chamber |
| 3-Axis Extractor                     | GRIPMAT-1      | 80 - 380 t       | Cold / Hot Chamber |
| 3-Axis Extractor                     | EM-1           | 160 - 380 t      | Cold Chamber       |

| Automation for DCM Range 380 to 640 t |                |                   |                    |
|---------------------------------------|----------------|-------------------|--------------------|
| Description                           | Type           | DCM Range         | DCM Type           |
| Rotational Ladle                      | FEEDMAT-4 (F4) | 380 - 640 t       | Cold Chamber       |
| Linear Ladle                          | DM-2           | 380 - 640 t       | Cold Chamber       |
| Sprayer                               | SM-2           | 380 - 640 t       | Cold Chamber       |
| 3-Axis Extractor                      | EM-2           | 380 - 640 t       | Cold Chamber       |
| 3-Axis Extractor                      | GRIPMAT-2      | 380 - 640 (830) t | Cold / Hot Chamber |
| 6-Axis Extractor                      | EM-1K          | 380 - 550 t       | Cold / Hot Chamber |
| 6-Axis Extractor                      | EM-2K          | 500 - 640 t       | Cold / Hot Chamber |

| Automation for DCM Range 640 to 1050 t |       |              |                    |
|----------------------------------------|-------|--------------|--------------------|
| Description                            | Type  | DCM Range    | DCM Type           |
| Linear Ladle                           | DM-3  | 640 - 1050 t | Cold Chamber       |
| Sprayer                                | SM-3  | 640 - 1050 t | Cold Chamber       |
| 6-Axis Extractor                       | EM-4K | 640 - 1050 t | Cold / Hot chamber |

| Automation for DCM Range 1050 to 4100 t |                |                      |                    |
|-----------------------------------------|----------------|----------------------|--------------------|
| Description                             | Type           | DCM Range            | DCM Type           |
| Linear Ladle                            | DM-4           | 1050 - 2500 (3500) t | Cold Chamber       |
| Linear Ladle                            | FEEDMAT-5 (F5) | 1050 - 2500 (3900) t | Cold Chamber       |
| Sprayer                                 | SM-4           | 1050 - 2500 t        | Cold Chamber       |
| 6-Axis Extractor                        | EM-4K          | 830 - 1600 (1900) t  | Cold / Hot Chamber |



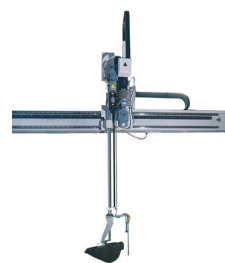
## LADLES



| LADLE                          | Linear DM-1  | Rotational F3   | Rotational F4   | Linear DM-2  |
|--------------------------------|--------------|-----------------|-----------------|--------------|
| Drive System                   | AC/Servo     | AC/Servo        | AC/Servo        | AC/Servo     |
| Horizontal motion [mm]         | 2000         | 2100            | 2200            | 2450         |
| Vertical motion [mm]           | 1130         | 1300            | 1400            | 1350         |
| Angle of casting               | +50°         | +180°           | +135°           | +50°         |
| Rollback angle                 | - 60°        | - 90°           | - 90°           | - 60°        |
| Repeated Dosing accuracy       | ±2%          | ±2%             | ±1%             | ±1%          |
| Horizontal velocity [m/s]      | 1,0 / 1,5    | -               | -               | 1,0 / 1,2    |
| Vertical velocity [m/s]        | 0,6 / 0,8    | -               | -               | 0,4 / 0,6    |
| Operation cycle [s]            | 15           | 16              | 20              | 20           |
| Max weight of dosed metal [kg] | 3,5          | 4,5             | 10              | 8            |
| Mounting                       | Fixed plate  | Ground mounting | Ground mounting | Fixed plate  |
| Locking Force [t] **           | 130 - 380    | 130 - 380       | 380 - 640       | 380 - 640    |
| DCM Type                       | Cold Chamber | Cold Chamber    | Cold Chamber    | Cold Chamber |



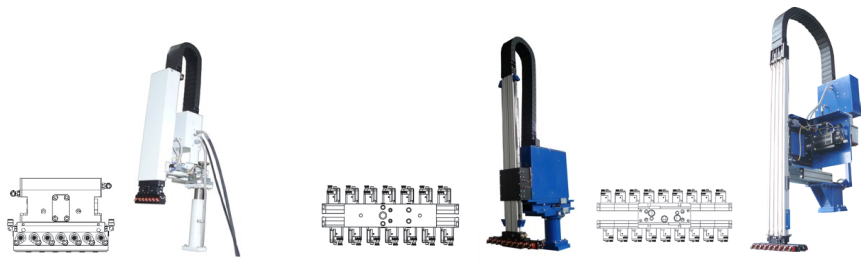
## LADLES



| LADLE                          | Linear DM-3  | Linear DM-4         | Linear F5           |
|--------------------------------|--------------|---------------------|---------------------|
| Drive System                   | AC/Servo     | AC/Servo            | AC/Servo            |
| Horizontal motion [mm]         | 2450         | 3600 (3900*)        | 3700 (4000*)        |
| Vertical motion [mm]           | 1350         | 1350 (1800*)        | 1350 (1800*)        |
| Angle of casting               | +50°         | +50°                | +50°                |
| Rollback angle                 | - 60°        | - 60°               | - 60°               |
| Repeated Dosing accuracy       | ±0,5%        | ±0,5%               | ±0,5%               |
| Horizontal velocity [m/s]      | 1,0 / 1,2    | 0,8 / 1,0           | 0,8 / 1,0           |
| Vertical velocity [m/s]        | 0,4 / 0,6    | 0,4 / 0,6           | 0,4 / 0,6           |
| Operation cycle [s]            | 25           | 40                  | 40                  |
| Max weight of dosed metal [kg] | 20           | 30                  | 30                  |
| Mounting                       | Fixed plate  | Fixed plate         | Fixed plate         |
| Locking Force [t] **           | 640 - 1050   | 1050 - 2500 (3500*) | 1050 - 2500 (3900*) |
| DCM Type                       | Cold Chamber | Cold Chamber        | Cold Chamber        |



## SPRAYERS



| SPRAYER                                           | SH-1P       | SH                 | SC            |
|---------------------------------------------------|-------------|--------------------|---------------|
| Drive System                                      | Pneumatic   | Servo              | Servo         |
| Number of nozzles* – Standard ÷ max to            | 2 x 7       | 2 x 7 ÷ 2x9        | 2 x 9 ÷ 4 x 9 |
| Blowing + Spraying circuits – Standard / Optional | 1 + 1       | 1 + 2              | 2+2 / 2+6     |
| Number of Axes                                    | 1-axis      | 1-axis             | 1-axis        |
| Passive horizontal adjustment [mm]                | 190         | 360                | 360 / 460     |
| Passive vertical adjustment [mm]                  | 50          | -                  | -             |
| Horizontal stroke [mm]                            | -           | -                  | -             |
| Vertical stroke [mm]                              | 650         | 800                | 900           |
| Horizontal velocity [m/s]                         | -           | -                  | -             |
| Vertical velocity [m/s]                           | 2           | 3                  | 3             |
| Air consumption at coating [l/min]                | 104         | 56                 | 83            |
| Air consumption at blowing [l/ min]               | 140         | 87                 | 120           |
| Liquid Tank [l]                                   | 25          | 150                | 150           |
| Locking Force [t] **                              | 50 - 80     | 80 - 315           | 130 - 380     |
| DCM Type                                          | Hot chamber | Cold / Hot chamber | Cold Chamber  |



## SPRAYERS



| SPRAYER                                           | SM-2             | SM-3            | SM-4            |
|---------------------------------------------------|------------------|-----------------|-----------------|
| Drive System                                      | AC / Servo       | AC / Servo      | Servo           |
| Number of nozzles* – Standard ÷ max to            | 2 x 8 ÷ 4 x 14   | 2 x 12 ÷ 4 x 18 | 2 x 15 ÷ 4 x 19 |
| Blowing + Spraying circuits – Standard / Optional | 1 + 2 / 2 + 6    | 2 + 6           | 2 + 6           |
| Number of Axes                                    | 2-axis           | 2-axis          | 2-axis          |
| Passive horizontal adjustment [mm]                | -                | -               | -               |
| Passive vertical adjustment [mm]                  | -                | -               | -               |
| Horizontal stroke [mm]                            | 1200             | 1200            | 1900            |
| Vertical stroke [mm]                              | 1300             | 1500            | 1900            |
| Horizontal velocity [m/s]                         | 1                | 1               | 0,7             |
| Vertical velocity [m/s]                           | 1                | 0,8             | 0,7             |
| Air consumption at coating [l/min]                | 73,5             | 120             | 150             |
| Air consumption at blowing [l/ min]               | 115              | 200             | 250             |
| Liquid Tank [l]                                   | 150              | 150             | 150             |
| Locking Force [t] **                              | 380 - 640        | 640 - 1050      | 1050 - 2500     |
| DCM Type                                          | Cold/Hot Chamber | Cold Chamber    | Cold Chamber    |

\* Example for number of nozzle for Spray head:

- Spray Head with 2 x 8 nozzles (2 lines, each with 8 nozzles) in one row

- Spray Head with 4 x 14 nozzles (2 lines, each with 14 nozzles) in two rows

## NOZZLES AND SPRAYHEADS

- Standard swinging nozzle with an external mixing, with a standard hole for liquid Ø1.5 mm and optional – 0.6, 0.8, 1.25 mm.
- Option for adding a copper pipe extension for each nozzle.
- Turning on and off the liquid with a controlled air pressure directly in the set.
- Adjustable quantity of liquid by each nozzle.
- Each nozzle can be used also for blowing under high pressure.



Spray Head with 1 row



Spray Head with 3 rows



| EXTRACTOR                 | EL                 | ELT                | GRIPMAT-1            | EM-1         |
|---------------------------|--------------------|--------------------|----------------------|--------------|
| Drive System              | Servo Pneumatic    | Servo Pneumatic    | AC / Servo Pneumatic | Pneumatic    |
| Number of Axes            | 3 axis             | 4 axis             | 3 axis               | 3 axis       |
| Cycle time [s]            | 6,5                | 8                  | 9 / 5,5              | 7,0          |
| Extracting time [s]       | 2,6                | 2,2                | 5 / 3,2              | 3,2          |
| Air consumption [l/min]   | 65                 | 100                | 270                  | 350          |
| Max casting weight [kg]   | 1,5                | 1,5                | 5 (6)                | 3            |
| Extracting stroke [mm]    | 1000 / 1300        | 1300               | 1785 / 1935          | 1430         |
| Slide [mm]                | 100                | 100                | 100 / 125 / 150      | 150          |
| Horizontal rotation       | -                  | 90°                | -                    | -            |
| Adjustment Z [mm]         | 320                | 200                | 450                  | 320          |
| Adjustment X [mm]         | 130                | 200                | 100                  | 180          |
| Adjustment Y [mm]         | -                  | -                  | 320                  | 110          |
| Part control - IR sensors | 4 / 6 / 8          | 4 / 6 / 8          | 4 / 6 / 8            | 4 / 6 / 8    |
| Mounting                  | Ground mounting    | Ground mounting    | Ground mounting      | Fixed plate  |
| Locking Force [t] **      | 80 - 130           | 80 - 200 (315)     | 80 - 380             | 160 - 380    |
| DCM Type                  | Cold / Hot Chamber | Cold / Hot Chamber | Cold / Hot Chamber   | Cold Chamber |



| EXTRACTOR                 | EM-2                 | GRIPMAT-2          | EM-1K                           | EM-2K              | EM-4K              |
|---------------------------|----------------------|--------------------|---------------------------------|--------------------|--------------------|
| Drive System              | AC / Servo Pneumatic | AC/Servo Pneumatic | Servo Pneumatic                 | Servo Pneumatic    | Servo Pneumatic    |
| Number of Axes            | 3 axis               | 3 axis             | 6 axis                          | 6 axis             | 6 axis             |
| Cycle time [s]            | 10 / 8               | 11 / 7             | Depends on number of operations |                    |                    |
| Extracting time [s]       | 7 / 6                | 7 / 5              | 4                               | 5                  | 6                  |
| Air consumption [l/min]   | 250                  | 410                | 3                               | 3,5                | 5                  |
| Max casting weight [kg]   | 8 (10)               | 10 (12)            | 7                               | 15                 | 50                 |
| Extracting stroke [mm]    | 2120                 | 2335 / 2614 / 2825 | Varies with layout              |                    |                    |
| Slide [mm]                | 200                  | 200                | -                               | -                  | -                  |
| Adjustment Z [mm]         | 320                  | 380                | -                               | -                  | -                  |
| Adjustment X [mm]         | 210                  | 150                | -                               | -                  | -                  |
| Adjustment Y [mm]         | 150                  | 500                | -                               | -                  | -                  |
| Part control - IR sensors | 4 / 6 / 8            | 4 / 6 / 8          | 4 / 6 / 8                       | 4 / 6 / 8          | 4 / 6 / 8          |
| Mounting                  | Fixed plate          | Ground mounting    | Ground mounting                 | Ground mounting    | Ground mounting    |
| Locking Force [t] **      | 380 - 640            | 380 - 640 (830)    | 380 - 550                       | 500 - 640          | 640 - 1600 (1900*) |
| DCM Type                  | Cold Chamber         | Cold / Hot Chamber | Cold / Hot Chamber              | Cold / Hot Chamber | Cold / Hot Chamber |



| CONTROL SYSTEM            | Control | Display             | Display build-in on the Control Cabinet's door | Option: Movable Stand |
|---------------------------|---------|---------------------|------------------------------------------------|-----------------------|
| Control System, type SCC  | Siemens | 4" Panel / 9" Touch | Yes                                            | No / Yes              |
|                           | RMC     | 7" / 15,6 " Touch   |                                                | Yes                   |
| Control System, type BCC  | Siemens | 4" Panel / 9" Touch | Yes                                            | No                    |
|                           | RMC     | 15,6 " Touch        |                                                | Yes                   |
| Control System, type SICC | RMC     | 15,6 " Touch        | Yes                                            | Yes                   |
| Control System, type BICC |         |                     |                                                |                       |





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